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THESIS

COST-EFFECTIVENESS STUDY OF POTENTIAL HC-130 AIRCRAFT ASSIGNMENT LOCATIONS IN THE U. S. COAST GUARD ATLANTIC AREA

by

Richard Dennis Herr

Thesis Advisor: D. E. Harrison, Jr.

September 1973

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Cost-Effectiveness Study of Potential HC-130 Aircraft Assignment Locations in the U. S. Coast Guard Atlantic Area

by

Richard Dennis Herr
Lieutenant Commander, United States Coast Guard
B.S., United States Coast Guard Academy, 1964

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN OPERATIONS RESEARCH

from the

NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

This study examines alternative locations for the eight HC-130, long-range, fixed-wing aircraft available in the U. S. Coast Guard Atlantic Area during the FY 75 - FY 84 period. The objective was to achieve the maximum effectiveness possible at a reasonable cost. A computer simulation of HC-130 air operations in the region of interest was developed to produce relevant cost and operational effectiveness measurements. The study indicates that of the three potential sites considered--Coast Guard Air Station Cape Cod, Massachusetts, Coast Guard Air Station Elizabeth City, North Carolina, and the St. Petersburg-Clearwater International Airport, Florida--assignment of three HC-130s at CGAS Elizabeth City and five at St. Petersburg-Clearwater is optimal.

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I. INTRODUCTION

Title 14 of the United States Code designates the United States Coast Guard as the government agency whose primary responsibility is to "...develop, establish, maintain and operate...rescue facilities for the promotion of safety on, under and over the high seas and waters subject to the jurisdiction of the United States... ." The Coast Guard is also tasked with numerous other duties which range in diversity from military readiness to oil pollution control.

To meet its widely varying responsibilities the Coast Guard utilizes several types of land, sea and airborne craft. These craft, and their operating and support personnel, must be located strategically to effectively carry out their missions in both an operationally and economically efficient manner. The high cost of aircraft, relative to most land and sea craft, along with their unique rescue, surveillance and logistics capabilities, makes the strategic location of aircraft and their support facilities and personnel particularly critical.

The aircraft inventory of the Coast Guard currently consists of the HU-16E medium-range, fixed-wing amphibian, the HH-52A short-range, amphibian helicopter, the HH-3F medium-range, amphibian helicopter and the HC-130 long-range, fixed-wing aircraft. Various combinations of these

aircraft are assigned at Coast Guard Air Stations throughout the United States.

The coastal areas of the United States are divided between two major operational commands. The Coast Guard Pacific Area includes the Pacific coast, Alaska and Hawaii, and the Coast Guard Atlantic Area is comprised of the Atlantic coast and the Gulf of Mexico.

For several reasons the optimal allocation of the long-range HC-130 aircraft in the Coast Guard Atlantic Area is worthy of special attention. The Coast Guard Atlantic Area already has a significant and growing requirement for long-range search and rescue (SAR), surveillance, and major logistics flights. The HC-130, a cargo/transport type aircraft, is ideally suited for all of these missions. In addition, recently allocated funds will provide for an increase in the number of HC-130s in the Coast Guard Atlantic Area from six to eight. With this increase in resources, the question of where to most optimally assign the available HC-130 aircraft within this region is being addressed by the service.

A large number of variable factors such as type of missions, mission occurrence times, location of aircraft, and availability of aircraft are significant in the operation of a small fleet of aircraft which must satisfy a multi-mission responsibility over a wide geographic area. A computer simulation model of aircraft operations and

maintenance in the Coast Guard Atlantic Area with provisions for various aircraft allocations and response capabilities was developed to consider these variables in the subject study. The simulation model was exercised extensively, the results evaluated, and observations made concerning the model and optimal location of HC-130 aircraft within the Coast Guard Atlantic Area.

II. NATURE OF THE PROBLEM

In fiscal year 1959 the United States Coast Guard began utilization of HC-130 long-range, fixed-wing aircraft in the prosecution of its multiple roles and missions in the Coast Guard Atlantic Area (COMLANTAREA). Since that time these aircraft, along with the HU-16E, a medium-range, fixed-wing aircraft, have provided all of the service's fixed-wing flight capability for both search and rescue (SAR) and other mission requirements. As indicated in Ref. 1, additional appropriations will increase the number of HC-130s in COMLANTAREA from the current six to eight by FY 1975, while the replacement of all HU-16E aircraft by small, medium-range, fixed-wing aircraft is scheduled for completion by FY 78. Through FY 73 all COMLANTAREA HC-130 aircraft were centrally located in relation to the command's maritime areas of responsibility. Because of the major alterations in resource types, numbers and capabilities, and the corresponding shifts in resource work load requirements both by type and location, the location of the limited number of HC-130 aircraft available must be carefully studied and plans must be formulated to optimize their operational capabilities subject to fiscal efficiency considerations.

In addressing the question of optimal location of the long-range, fixed-wing aircraft within COMLANTAREA, an

understanding of the factors which affect the utilization of these aircraft such as command and control, current locations of other aircraft, individual aircraft type characteristics and mission requirements is essential.

A. GEOGRAPHICAL AREA AND OPERATIONAL CONTROL

COMLANTAREA is a purely operational command headquartered at Governor's Island, New York, which has primary responsibility for the Atlantic and Gulf of Mexico coastal states, plus New Mexico and Vermont and the waters adjacent thereto. The operational area is divided into the First, Third, Fifth, Seventh and Eighth Coast Guard Districts which are both operational and administrative commands. The COMLANTAREA Coast Guard Air Stations are Coast Guard Air Station (CGAS) Cape Cod, CGAS Brooklyn, CGAS Cape May, CGAS Elizabeth City, CGAS Savannah, CGAS Miami, CGAS Puerto Rico, CGAS St. Petersburg, CGAS Mobile, CGAS New Orleans, CGAS Houston and CGAS Corpus Christi.

Primary control of an aircraft is vested in the district commander within whose district the aircraft is assigned. Missions occurring within the district boundaries, or generated by individual district commanders, are carried out under that district commander's control by the aircraft assigned within the district, if the capability exists. When missions cross district boundaries and/or involve units from more than one district, COMLANTAREA controls the mission and the units involved. This alternative

control is important. In the past, with all the HC-130s located in the Fifth Coast Guard District, COMLANTAREA controlled their operational utilization to a significant degree.

The primary SAR region of responsibility for COMLANTAREA is the Atlantic Ocean off the coast of the United States and the Gulf of Mexico. It also conducts many SAR missions in the Caribbean Sea and the North Atlantic Ocean off the Canadian coast.

B. AIRCRAFT CHARACTERISTICS

1. HU-16E "Grumman Albatross"

The Grumman HU-16E twin reciprocating-engine, amphibious, fixed-wing aircraft, is capable of performing medium logistic missions, but is used primarily as a surveillance and search vehicle with rescue equipment (rafts, dewatering pumps, general emergency supplies) and night illumination delivery capability. Its normal cruising speed is 140 knots. The HU-16E effective offshore search radius with two and one-half hours of search time on-scene is 500 nautical miles. Although an amphibian, use of the HU-16E for water surface recovery was officially terminated in FY 73.

2. HH-52A "Sikorsky Sea-Guard"

The Sikorsky HH-52A single-turbine, amphibious helicopter is primarily a short-range SAR vehicle with a limited rescue equipment delivery capability. Also, it is

used for small, light-weight, logistics missions and various types of "local" surveillance flights. The HH-52A has a normal cruising speed of 90 knots with a maximum offshore range of 150 nautical miles allowing a loiter time of 20 minutes on-scene. Because they have a single engine, Coast Guard air operations doctrine requires air cover for HH-52As when operating off the coast.

3. HH-3F "Sikorsky Pelican"

The Sikorsky HH-3F twin turbine, amphibious helicopter is a medium-range SAR vehicle with a full rescue equipment and night illumination delivery capability. It is also capable of performing logistics missions and medium-range surveillance flights. Its normal cruise speed is 125 knots. The HH-3F can either proceed 300 nautical miles offshore allowing a loiter time of 20 minutes on-scene or 200 nautical miles allowing a loiter time of two and one-half hours for search.

4. HC-130 "Lockheed Hercules"

The Lockheed HC-130, a four-engine, turbo-prop, long-range, fixed-wing aircraft, is capable of performing major personnel and cargo logistics missions as well as extended surveillance and search missions. It also has the capability of air dropping rescue equipment and providing night illumination. At the time of this study, both "B" and "E" models of the HC-130 were in the COMLANTAREA inventory. The HC-130 has a normal cruising speed of 300 knots at altitude. The "B" model is capable

of proceeding twelve hundred miles offshore at high altitude, letting down and searching for two and one-half hours on two engines, and returning to base at high altitude. The "E" model HC-130 has an approximately thirty per cent increased range/endurance capability.

5. Planned Medium-Range, Fixed-Wing Replacement Aircraft

A replacement medium-range search/surveillance (MRS) aircraft is scheduled for implementation into the Coast Guard aviation system beginning in FY 74. The type aircraft selected is anticipated to be a

> "...limited mission aircraft to perform MEP (marine environmental protection), short-range ELT (enforcement of laws and treaties) and other missions within its capability."[1]

These aircraft are primarily intended to accomplish the non-SAR missions previously performed by HU-16E aircraft. At the time of this study, two small turbojet aircraft with speeds of approximately 400 knots and ranges of 1200 to 1800 nautical miles were being evaluated for this role.

---

[1] Coast Guard Aircraft Characteristics Board Report dated 31 May 1972.

C. AIRCRAFT ALLOCATIONS

1. COMLANTAREA Aircraft Assignments in FY 73

UNIT	C-130	HU-16E	HH-3F	HH-52A	MRS
Portland	-	-	-	3	-
Cape Cod	-	3	3	4	-
Brooklyn	-	-	3	3	-
Cape May	-	-	-	3	-
Elizabeth City	6	3	-	3	-
Savannah	-	-	-	3	-
Miami	-	5	-	3	-
Puerto Rico	-	-	3	-	-
St. Petersburg	-	-	4	-	-
Mobile	-	3	-	-	-
New Orleans	-	-	4	-	-
Houston	-	-	-	3	-
Corpus Christi	-	4	-	2	-

2. COMLANTAREA Planned Aircraft Assignments in FY 78

UNIT	C-130	HU-16E	HH-3F	HH-52A	MRS
Portland	-	-	-	3	-
Cape Cod	5	-	3	-	3
Brooklyn	-	-	-	7	-
Cape May	-	-	-	4	-
Elizabeth City	-	-	4	-	3
Savannah	-	-	-	3	-
Cocoa Beach	3	-	-	2	-
Miami	-	-	-	5	6

UNIT	C-130	HU-16E	HH-3F	HH-52A	MRS
Puerto Rico	-	-	2	-	2
St. Petersburg	-	-	5	-	-
Mobile	-	-	-	-	2
New Orleans	-	-	4	-	-
Houston	-	-	-	4	-
Corpus Christi	-	-	-	3	3

D. MISSION REQUIREMENTS AND PRIORITIES FOR COMLANTAREA HC-130 AIRCRAFT

As a result of the wide range of programs for which the Coast Guard is responsible, many extremely varied types of missions must be performed. A general breakdown into mission classes is often made using SAR and non-SAR classifications. SAR missions normally have the highest priority. However, in COMLANTAREA only approximately thirty-two per cent of the total HC-130 flight hours and forty-one per cent of the program HC-130 flight hours are devoted to SAR missions. This is not to minimize the importance of the SAR responsibilities for the COMLANTAREA HC-130s. By their very nature SAR missions are normally emergencies which require quick and efficient action. However, to study the efficient utilization of HC-130s in COMLANTAREA, the non-SAR requirements as well as the more critical SAR requirements for flight hours must be identified and given due consideration.

1. SAR Missions

There are many different types of SAR missions which include, but are not limited to:

Routine searches for overdue boats.

Removal of personnel from vessels or water.

Searching for survivors of disasters at sea.

Airborne delivery of rafts, survival equipment and dewatering pumps.

Night illumination by flares.

Intercept of aircraft in distress.

Navigational assistance.

Surveillance of distressed craft.

Depending on the type of case, one or more aircraft may be required. As noted in paragraph B above, many of the aircraft types have overlapping operational capabilities. The HC-130s, because of their size, endurance and speed, are particularly well suited for long searches, long-term surveillance of distressed craft, navigational assistance, night illumination, and distressed aircraft intercepts. The HC-130s can perform all missions except the retrieval of survivors from the water or surface craft. Also, because of its crew size and extensive communications capability, the HC-130 is a very effective on-scene commander platform for search efforts involving many units.

The assignment of priorities to SAR missions is a matter of command decision. When sufficient resources of the required type are available priorities need not be

designated. However, when this is not the case, aircraft substitution decisions must be made, and aircraft must be allocated among missions. Every situation is different and must be treated individually. Aircraft allocation depends on the decision-maker's opinion of the relative urgency of each case. Even in times of SAR mission saturation every effort is made to give each case at least partial coverage. When mission requirements exceed the Coast Guard's resources, assistance is normally requested, and received, from the U. S. Air Force Air Rescue and Recovery Service as well as other military organizations.

2. Non-SAR Missions

Without delving into specific program definitions, non-SAR aircraft missions may be primarily characterized as transportation of personnel and cargo, training and surveillance flights. Due to the location of U. S. Coast Guard Headquarters, the U. S. Coast Guard Academy and the U. S. Coast Guard Aircraft Repair and Supply Center within COMLANTAREA and the aviation requirements of the International Ice Patrol the non-SAR mission load for COMLANTAREA aircraft is heavy. The HC-130s, with their range, size and speed, are utilized to satisfy a large portion of the non-SAR work load in COMLANTAREA.

Non-SAR missions are generated by U. S. Coast Guard Headquarters, COMLANTAREA and the individual district commanders. In general, non-SAR missions are lower in priority classification than all SAR missions. The only

exceptions are the International Ice Patrol flights during the ice season and a very limited number of extremely high priority logistics flights. The exception for the International Ice Patrol flights is made because these flights very closely approach full SAR mission status in their importance to the preservation of life and property. The ice season varies in different years but usually runs from March through July. During this period approximately four flights per week are required with on-scene times of four to five hours over the general area of the Grand Banks of Newfoundland. Since the decommissioning of CGAS Argentia in FY 67 one HC-130 aircraft with double crew has been operated on a temporary additional duty status from airfields in eastern Canada during the ice patrol season. The crews are rotated on a two-week cycle and the aircraft are rotated as required for periodic maintenance. In addition to the flights during the ice season, several flights along the coast of Greenland are made throughout the year to predict the ice flow.

Flights for the U. S. Coast Guard Academy and the Electronics Engineering Branch are assigned by U. S. Coast Guard Headquarters. A heavy requirement exists for personnel transportation both for cadets and the U. S. Coast Guard Band to and from the academy which is located at New London, Connecticut. While particularly heavy during the summer months, the requirement exists throughout the year. Most of the flights are limited to the eastern half of the

United States. The primary flight requirements for the U. S. Coast Guard Electronics Branch with its field center at Wildwood, New Jersey, involve the transportation of personnel and equipment for monitoring Long Range Aid to Navigation (LORAN) stations throughout the world. These flights are normally designated for the "E" model HC-130 aircraft because of headquarters funding and the aircraft's special configuration. These missions last from three days to as long as two months. Coast Guard Headquarters also directs the movement of supplies from the Aircraft Repair and Supply Center in Elizabeth City, North Carolina; personnel and equipment transportation from Washington, D. C., for oceanographic research work; as well as general logistics flights from Washington, D. C., and other points throughout the world.

In addition to International Ice Patrol flights, COMLANTAREA directs flights for movement of operational cargo such as equipment for air drop to vessels underway and oil dispersement liquids and apparatus, as well as surveillance flights. Surveillance flights are conducted for a variety of reasons including the enforcement of fishing treaties and detection of oil pollution. The non-SAR flight requirements generated by the individual district commanders consist primarily of small-scale personnel and equipment transportation, as well as surveillance missions and helicopter cover flights for HH-52As operating offshore.

The assignment of priorities for non-SAR missions is not so critical as that for SAR missions because the preservation of human life normally is not involved. Within the non-SAR mission classification, the highest priorities involve the International Ice Patrol flights, critical operational cargo movement, and personnel transportation. Unlike SAR missions, many non-SAR missions can conveniently be delayed or, if necessary, performed by other means.

E. NON-OPERATIONAL FACTORS AFFECTING AIRCRAFT AVAILABILITY

There are basically three factors which affect the availability of aircraft which are not already operationally deployed. These factors are maintenance, manning personnel, and weather.

1. Maintenance

Mechanical difficulties and preventative maintenance criteria are the primary limitation on aircraft availability. Aircraft mechanical discrepancies normally are found during preflight inspection, in flight, and during post-flight inspection. Depending on the seriousness of the mechanical discrepancies which occur in flight, the mission may be either completed or aborted. HC-130 discrepancies may require as little as fifteen minutes, or as many as three days, to correct. Of course, the delay may be longer if parts are not readily available, or an "out of house" inspection team's assistance is required.

Primary preventive maintenance is currently conducted during maintenance check periods. Aircraft checks for HC-130 aircraft are mandatory after every sixty-three calendar days or two hundred flight hours, whichever occurs first [Ref. 1]. HC-130 aircraft checks require an average of seven calendar days. Extensions on day/flight hour limitations between aircraft checks are extremely limited, thus creating another factor that must be considered in assigning aircraft to missions. Due to limitations on space and manpower, having more than one HC-130 requiring a maintenance check at a particular time must be avoided. The evaluation of a computerized maintenance program for HC-130s was initiated in FY 73 [Ref. 1]. If found feasible, and implemented, such a program would greatly reduce or possibly negate the large down-time required for each aircraft check.

2. Manning Personnel

The normal operational crew for an HC-130 varies from five to nine depending on the type mission being conducted. Although the Coast Guard places flight hour and associated rest criteria limitations on aircrew members, as delineated in Ref. 3, the availability of qualified aircrew personnel is seldom a limiting factor for aircraft availability at home stations. During "non-working" hours ready crews are kept aboard air stations for immediate SAR mission response and additional crews can normally be recalled without undue delay.

3. Weather

The weather factor/effect generally depends on time of year and locale. When weather at fields where aircraft are located is below instrument flight rule minimums aircraft will not depart for other than the most critically urgent SAR cases. While sometimes a factor restricting the use of aircraft on-scene for SAR or other operational missions in COMLANTAREA, weather only infrequently affects the availability of aircraft for such missions.

F. MEASURES OF EFFECTIVENESS

Because of the multi-type mission requirements of the COMLANTAREA HC-130s, the limited number of these aircraft available, and the restricted operational budget of the Coast Guard, it is important that meaningful measures of operational effectiveness, in both of the major mission classifications and overall economical effectiveness, be selected and considered as part of a total decision assistance package.

The determination of measures of operational effectiveness is particularly difficult in the case of SAR missions in view of the often intangible results achieved. To use the number of human lives assisted or saved as a measure of SAR operational effectiveness would be as gross an oversimplification as would the use of unanswered SAR cases. In one situation a search may be conducted for many days by several different units without a successful conclusion.

In another case a rescue vehicle may be directed to the scene of concern and a rescue effected within minutes. While the latter case gives a more graphic display of effectiveness, it cannot be assumed that the performance of units in the former situation was operationally ineffective. Meaningful measures of SAR effectiveness might include speed of response, ability to respond in the quantity and duration desired, or number of SAR flights completed.

Measures of effectiveness for non-SAR missions are more readily available in view of the generally "go/no-go" nature of the missions. Possible measures of effectiveness might include number of non-SAR flights completed, number of non-SAR missions not performed, or failures to respond in the quantity or for the duration required.

It is important to realize that both SAR and non-SAR effectiveness will be affected by command priority decisions within, and between, these flight mission classifications.

Variation in the cost of HC-130 operations is primarily affected by non-productive flight hours (extra flight hours required for a mission caused by the responding aircraft not being at the air station closest to the mission location), number of support facilities maintained, and requirements for deployment of aircraft and crews. These factors provide a basis for developing economic measures of effectiveness.

III. METHODOLOGY

To facilitate the evaluation of the effectiveness and associated costs of different distributions of the available HC-130 aircraft in COMLANTAREA a simulation model of Coast Guard aircraft operations in the Atlantic Ocean and Gulf of Mexico was required. Although a search and rescue simulation model has been developed for the United States Coast Guard [Ref. 4], it does not address the service's non-SAR mission responsibilities. In addition, it models neither the area nor the specific resources of concern in this study to the degree of significance required. Therefore, a new simulation of the required scope and detail was developed. The simulation developed specifically for this study is a fixed, one-hour time step, stochastic model programmed in FORTRAN IV for the IBM-360 computer. The program requires approximately 170K of core storage and a running time in the vicinity of twenty seconds per replication year. The simulation model produces means and variances of selected measures of both cost and operational effectiveness.

A. SIMULATION MODEL

The simulation model consists of a main program and five subroutines. The model stochastically develops SAR cases and non-SAR missions with exponential interarrival times. The cases and missions are then handled with available HC-130s or, if possible, with helicopters when HC-130s are

not available, according to a predefined set of decision rules. At the conclusion of each case and mission the number of mission flight hours and/or case on-scene hours that could not be satisfied with HC-130s or helicopters are recorded. When an HC-130 must undertake a case or mission from an air station which is not the station closest to the case or mission the extra flight hours required are tallied. When HC-130s are required to remain overnight (RON) at air stations other than the one to which they are assigned because of maintenance difficulties or crew flight time restrictions, the RONs are tallied.

The simulation model is designed to allow selection of any of three sites on the east coast of the United States as prospective locations for as many as fifteen HC-130s (total). Provision has been made for as many as 25 helicopter stations on the eastern and gulf coasts. The operator can specify more than 250 variable parameters in the program ranging from weather factors to SAR case and mission priority distributions. A listing of the variable input parameters may be found in Appendix B. Seasonal variables such as weather, case occurrence rates and location distributions may be entered by months and the program automatically alters these parameters each simulation month. Some of the other operational refinements that the simulation model possesses include:

(1) Inflight abort of aircraft.

(2) Inflight shifting of aircraft between SAR cases.

(3) Substitution of helicopters for HC-130s.

(4) "Closing" of air stations due to weather.

(5) Maintenance downing of aircraft upon landing and at start-up.

(6) Shifting availability rates for helicopters as determined by number assigned to station and number on HC-130 cases.

(7) Holding of non-SAR missions for variable periods if HC-130s are not available.

(8) Built-in decision rules for allocation of HC-130s among cases and missions when insufficient resources exist.

(9) Continuous on-scene coverage capability on SAR cases for up to 24 hours.

(10) Assignment of up to four HC-130s to a particular SAR case.

(11) Shifting of aircraft between air stations.

A detailed discussion of the simulation model's execution procedures and decision rules is contained in Appendix D.

1. Assumptions

Most of the design assumptions made in the computer simulation were included for simplicity. Other assumptions, implicit in the operation of the program, were necessitated by a lack of factual data. The model assumptions include:

a. SAR Case and Non-SAR Mission Occurrence Times

Both sets of occurrence times are assumed to be characterized by Poisson distributions. Three separate rates are used for each month: two for SAR and one for non-SAR missions. The SAR mission rates are for peak rate

and non-peak rate days in the week. Occurrence rates are assumed to be unaffected by time of day.

b. SAR and Non-SAR Mission Departure Times

Because of daylight conditions, it is assumed that aircraft will not depart on non-continuous SAR cases prior to 0600 or after 1600 daily. Normal mission departure times are assumed to be at 0800 and 1200 daily. Special missions and continuous SAR case departures are made regardless of time of day.

c. HC-130 Maintenance Discrepancy Times

It is assumed that discrepancies on HC-130s are noted in flight, after landing and on start-up.

d. Area Design

The east coast of the United States is represented by a straight line running approximately through Otis Air Force Base, Massachusetts, and Daytona Beach, Florida. The Gulf of Mexico is then modeled as a rectangle extending to the west and displaced slightly to the south. The displacement to the south is done to keep flight distances as nearly in proportion as possible. The southern limit of the simulated area is represented by a line perpendicular to an extension of the simulated Atlantic coast line and passing 20 nautical miles southwest of Mérida on the Yucatan Peninsula. Air stations and mission pick up points within 100 nautical miles of the simulated coast lines are projected perpendicular to the simulated coast lines. See Figure 1.

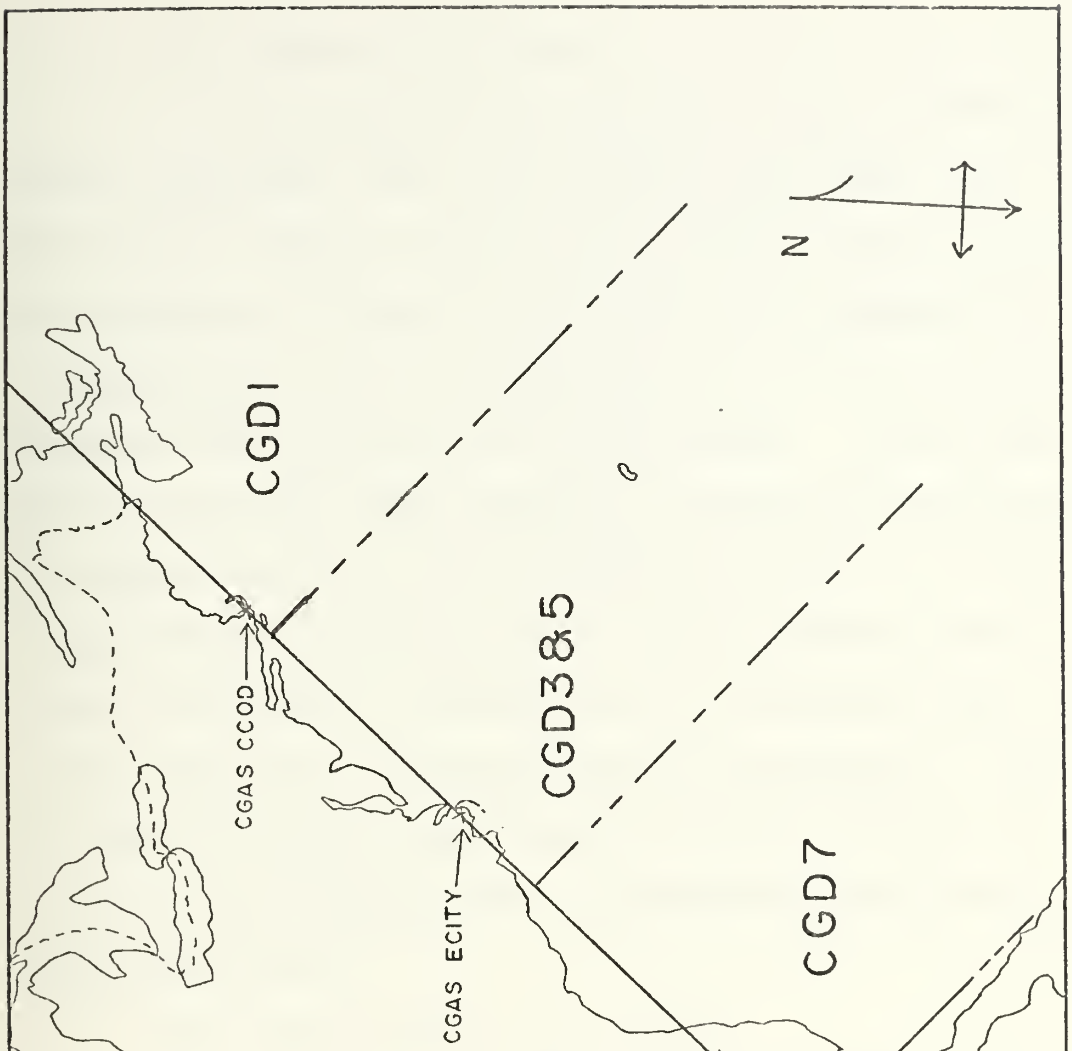


FIGURE 1

e. SAR Case Positions

A discrete distribution of cases between the First, Third and Fifth, and Seventh and Eighth Coast Guard Districts is used. For all cases in the Atlantic Ocean, the distances offshore are assumed to be exponentially distributed from 10 to 1,000 nautical miles with the mean distance being specified by the operator. In the Gulf of Mexico all cases are assumed to be uniformly distributed throughout the area. In the Atlantic Ocean all cases except those in the First Coast Guard District north of Maine are assumed to be uniformly distributed along the coast within the respective district groupings. Cases in the First Coast Guard District north of Maine are assumed to be exponentially distributed along the coast from Maine north.

f. International Ice Patrol

It is assumed that one HC-130 from the most northern air station having HC-130s assigned will be deployed for the period March through July and will fly 500 hours on ice patrol.

g. Inflight Abort

For an HC-130 aborting a flight it is assumed the aircraft will fly directly to the closest HC-130 air station at 200 knots. Aborts are only considered for SAR case flights and flights transferring aircraft between HC-130 stations.

h. Operating Locations

It is assumed that HC-130s will only operate out of, and RON at, designated HC-130 air stations.

i. Short-Range Recovery Capability

In the event of HC-130 non-availability it is assumed that HH-3F helicopters are preferable to HH-52A helicopters for substitution if the case location and type are amenable to helicopter substitution. The simulation does not provide for MRS aircraft as they are considered to be designated for specialized non-SAR missions.

j. Flight Distances

All distances to SAR cases are considered to be straight line distances. Distances between air stations and other locations ashore are computed as straight line distances and then corrected for increases caused by flying airway routes.

k. Personnel Availability

It is assumed that personnel availability is not a factor in determining aircraft availability for aircraft at their home air stations. For aircraft away from their home stations, flight crew rest criteria are considered as a limiting factor in the return of such aircraft to their home stations.

l. Allocation Restrictions

In selecting possible allocation alternatives between three proposed locations it is assumed that no less than three HC-130s will be assigned to one location.

m. Number of Aircraft Assigned to SAR Cases

It is assumed that no more than four HC-130s will be assigned to any one SAR case.

n. Non-SAR Mission Origin Locations

The primary origin locations for HC-130 mission requirements are considered to be at the three proposed HC-130 air stations, the U. S. Coast Guard Academy, Washington, D. C., and the five district offices in COMLANTAREA.

o. Training Flights

While training flights consume a large portion of available flight time they are not considered to be a limiting criterion in fulfillment of SAR and non-SAR mission requirements. Therefore, training flights are not provided for within the simulation model.

p. Aircraft Accountability

HC-130s on SAR cases are launched and returned for each individual sortie. HC-130s on non-SAR missions are launched for the mission and are assumed to be unavailable for other missions or cases until termination of the mission to which assigned.

q. HC-130 Maintenance

The minimum down time due to any one mechanical discrepancy considered by the simulation is two hours and the maximum is 72 hours. It has been assumed that the computerized check procedure will be in effect, thus alleviating

large down times for check maintenance. All HC-130s returning from flights which do not have mechanical discrepancies are considered unavailable for one hour after landing. This provides for refueling, etc. These "refueling periods" are not tallied as down times.

r. HC-130 Flight Endurance

It is assumed that the maximum flight endurance for HC-130s, allowing adequate fuel reserve, is ten hours.

s. Inflight Aircraft Location

If an aircraft is to be diverted or must abort a flight it is assumed to be half way between its initial or interim point of departure and interim or final destination or at the SAR case datum point depending on its employment status.

2. Verification

The simulation model was constructed by sectioning the main program and adding subroutines as new sections of the main program which required the use of a particular subroutine were developed. After each milestone in programming was reached, such as case occurrence time generation, mission characteristics generation in subroutine MICA, addition of subroutine PLANE, etc., verification runs were made. The purpose of the verification runs was to ensure that the newly added portion of the program was performing as the programmer intended and also to be sure

that the operation of the previously programmed portion of the model had not been altered by the new addition. The model was debugged and positive verification completed after each milestone before proceeding further.

3. Validation

Validation of the model required specific real world data with which to compare the results obtained from the model. Although data are available on HC-130 operations in COMLANTAREA, they are not in the form required by the model. The only data readily available are the number of hours the COMLANTAREA HC-130s have flown. These hours are broken down by programs but breakdowns within the program areas are not available. General SAR data breakdowns are supplied to Coast Guard Headquarters but the capability to readily aggregate this information in the specific detail required by the subject simulation does not, as yet, exist.

In order to approach validation of the simulation model the program flight data for COMLANTAREA HC-130s in FYs 70-72 were gathered. The data were then organized into the form required by the model by subjective analysis based on experience. The other variable parameters required by the program were selected in a like manner. The simulation was then run with six HC-130s located at CGAS Elizabeth City, North Carolina, which was the assignment situation when the general data were gathered. Using a confidence level of 95% and uncertainty limit of 5% the simulation

indicated that 6.44% of the SAR case on-scene hours and 5.29% of the mission hours which were actually covered could not be covered under the simulated conditions. Realizing that a computer simulation can only approach the real world and can never be programmed to institute the vast capability of the human mind to adapt to constantly shifting decision situations, the results of this validation run are considered to indicate that the model, within limits, favorably reflects the system as it actually operates.

Further satisfaction in the validity of the model is gained when evaluating the results of the sensitivity analysis.

4. Sensitivity Analysis

After the base parameters had been determined for the first year to be investigated--FY 75--a sensitivity analysis of the simulation was conducted using an assignment distribution of three HC-130s at the central air station and five at the southern air station. Individual parameters were changed, usually by 10%, with the other parameters fixed at their base values. In the case of discrete cumulative distribution functions (CDFs), the mean values of the CDFs were shifted 10%. Relative changes in the mean statistics were calculated as percentage increases or decreases from the base mean statistics. When the total SAR on-scene hours and/or mission flight hours requested were changed due to a change in a base

parameter, the relative changes in the mean statistics were calculated as changes in percentages using base mean statistics and base total hours requested versus the newly generated mean statistics and total hours requested.

The results of the sensitivity analysis are tabulated in Appendix C. Few of the parameter changes effected major changes in the measures of effectiveness or cost and all of the changes corresponded with what could be expected in the actual operational system. The most significant changes resulted when the mean priorities of the SAR cases and non-SAR missions were altered. Of particular note was the relative stability of the SAR coverage as compared to the mission coverage. This would indicate that the simulation, with the base parameters as specified, is biased toward the SAR work load. This bias is also indicated in the changes produced by increasing the SAR cases and non-SAR missions per year with the greater losses being found in mission flight hours. Significant decreases in both mission and SAR coverage were noted with a shift of mean SAR case location 10% to the north which is understandable in light of the aircraft assignment distribution used for the analysis. Also worthy of note is the relative insignificance of changes resulting from altering the helicopter availability parameters.

B. MEASURES OF EFFECTIVENESS

Because of the multi-purpose role filled by HC-130s, a single measure of operational effectiveness such as total number of hours flown is considered inappropriate. With the general split in the HC-130 responsibilities being made between SAR and non-SAR missions, a measure of operational effectiveness for each of these two major employment classifications is considered necessary. By selecting a measure of effectiveness for each of the two general employment classifications the manager/decision-maker is presented with a more detailed picture and is provided with the opportunity to individually weigh the importance of each in his operational utility function.

The measures of operation effectiveness selected in this study are the number of SAR on-scene hours requested that cannot be satisfied and the number of non-SAR mission flight hours requested that cannot be flown. Several alternative measures of effectiveness were evaluated but, because of the general characteristics of the HC-130, these measures were considered to be the most representative performance level indicators of HC-130 operational requirements.

C. RELEVANT COST FACTORS

In evaluating the costs corresponding to the different potential assignment distributions of the HC-130s in COMLANTAREA, the relevant costs, those costs that will

vary with the different assignment distributions, must be identified. With the acquisition of the aircraft already determined and thus the requirement for flight crews fixed, many of the overall system costs could be disregarded as independent of the assignment decision to be made.

The relevant costs, depending on the assignment distribution being considered, fall into three broad classifications: base procurement, facility construction and improvement, and operating costs. Base procurement cost is relevant in the situation where HC-130s are to be assigned to a location where a military air field has not existed previously. Facility construction and improvement costs are involved whenever, due to the addition of HC-130s or because of continued assignment of HC-130s, new hangars and other facilities must be built or renovated.

The broad classification of operating costs can be split into direct and indirect operating costs. Direct operating costs include those costs resulting from the actual operation of the aircraft. In evaluating the differences between location distributions the relevant costs are the fuel and maintenance costs of operational and extra flight hours flown and the per diem costs associated with flight crews that must remain away from their home units. The simulation model gathers both the extra flight hours and RON statistics which result from the various assignment distributions of aircraft during each simulation run.

The potentially relevant indirect operating costs include:

(1) Additional base operating expenses resulting from having HC-130s at two different air stations.

(2) Cost of maintaining separate inventories of repair parts and maintenance equipment, and

(3) Command and control costs associated with adding another air station.

IV. DATA DEVELOPMENT AND ANALYSIS

Following the selection of relevant cost factors and meaningful measures of effectiveness it was necessary to exercise the simulation model to obtain the data pertinent to the study.

A. BASE CASE SPECIFICATION

The first requirement, in order to exercise the model, was to specify the basic inputs for the first year to be considered, FY 75. As pointed out in Chapter III, a data base in the form and detail required by the model is not available. In order to develop the values of the basic inputs and requirements for the first year, data in varying forms were gathered and transformed--through subjective analysis based on experience with the system--into input values for the specification variables of the model. The basic variable values may be found in Appendix B.

As noted in the sensitivity analysis discussion, the two variables which displayed the greatest effect on the model results were the general SAR case location distribution and the SAR case and non-SAR mission loads. To specify the general SAR case location distribution, FY 71 data on case distances offshore (by districts) was obtained and interfaced with district aircraft trackline miles found in Ref. 5. These factors were considered indicative of general HC-130 SAR case location distributions because of

the aircraft's primary SAR utilization as a long-range search vehicle. The results obtained indicated fifteen per cent of the HC-130 cases occur in the First Coast Guard District, twenty-five per cent in the Third and Fifth Coast Guard Districts and the remaining sixty per cent in the Seventh and Eighth Coast Guard Districts.

The determination of projected FY 75 HC-130 requested SAR case on-scene and non-SAR mission flight hours was, of necessity, highly subjective. This was caused by the fact that the Coast Guard has never maintained data on the requests for HC-130 services which have not been met and also because the model differentiates in its treatment of domestic and deployment SAR requirements. Domestic SAR requirements are those SAR cases which are met on a continuing basis from the proposed HC-130 air stations and are the SAR cases modeled in the simulation. Deployment SAR requirements are those cases which are outside of the normal COMLANTAREA operating areas. These cases are modeled as priority one "non-SAR" missions in the simulation. Another factor contributing to this subjectivity in case and mission load selections was the assumption that the medium-range surveillance (MRS) aircraft would not perform SAR flights.

A basis for the subjective determination of FY 75 SAR and mission loads was the forecast requirements found in Ref. 1. One-half of the HC-130 Marine Environmental Protection (MEP) and Enforcement of Laws and Treaties (ELT)

flight hour requirements [Ref. 1] were transferred to the MRS aircraft and, in return, one-half of the MRS projected SAR requirements were transferred to the HC-130s. One quarter of the projected SAR hours forecast for HC-130s were transferred to the HC-130 non-SAR mission load as deployment SAR cases. Finally, ten per cent of the total HC-130 SAR hours remaining were cut as enroute time because the model only considers on-scene time. Ten per cent is felt to be sufficiently low so that the remaining enroute hours coupled with the added MRS SAR requirements give a better indication of the total needs for HC-130 services. A less satisfactory alternative would be the normally programmed number of hours the aircraft are expected to be able to accomplish. This requirement for desired versus programmed capability was also met for "non-SAR" mission flight hours by transferring only half of the HC-130 MEP/ELT flight hour requirements to the MRS aircraft.

Helicopter assignments and availabilities were based on the projected assignment status in Ref. 1 and the readiness data found in Ref. 6. Because the model does not provide for aircraft maintenance down-time other than during start-up and landing, these figures, both for probability of down status and the duration of down-time, appear high. However, the selected parameter values produce acceptable overall down-time during the model's performance, an effective range of 25 to 30 per cent of the potential HC-130 flight hours available.

B. DATA PRODUCTION PROCEDURES

Data were gathered for the projected remaining operational lifetime of the HC-130s, FY 75 through FY 84. The forecast annual growth rate for maritime activity in the area of concern is 4.4% [Ref. 7]. Reference 1 forecasts an unchanging requirement for HC-130 SAR hours throughout the ten-year period which would indicate that this forecast requirement figure is considered a program limit rather than a true "requirement" or need for HC-130 SAR flight hours. Although the forecast HC-130 mission flight hour requirements in Ref. 1 fluctuate, they do not show any significant growth rate. This view is not consistent with the thrust of this study: To consider the effect of assignment location on the ability to meet all requirements made for HC-130 services. Therefore, without other guidelines available, a 4.4% growth rate per annum was used to forecast yearly SAR on-scene and non-SAR mission flight hour loads projected from the FY 75 base loads. The SAR on-scene and mission flight hour requirements specified for each year may be found in Appendix A.

The three assignment locations evaluated in this study were the primary sites now under consideration by the Coast Guard, CGAS Cape Cod, CGAS Elizabeth City and the St. Petersburg-Clearwater International Airport. The number of replications required for each assignment distribution in each year was calculated for a confidence level of 0.95 and an uncertainty limit of 0.05. However, because of

computer time and scheduling limitations, each assignment distribution was exercised for a fixed 100 replication years. Following the completion of runs for all twelve assignment distributions for a particular year, the SAR case and non-SAR mission loads were increased by the 4.4% per annum growth factor and the random number generator seeds set at the termination values from the previous year's runs. Runs for the next year were then made. A summary of the resulting data is contained in Appendix A.

C. DATA ANALYSIS AND RESULTS

Determination of the number of replication years required to meet the specified confidence level and uncertainty limit (0.95, 0.05) was based on the assumption that the output data are normally distributed, a direct application of the Central Limit Theorem. The computational form used in the program is

$$N = \left[\frac{C}{E}\right]^2 \left[\frac{\bar{X}^2}{(\bar{X})^2} - 1\right]$$

where N = Number of Replication Years required.

C = Normal critical value for confidence level.

E = Uncertainty limit.

$\bar{x}$ = Observation (year mean).

With the N value calculated for specified E and C values,

the

$$\left[\frac{\bar{X}^2}{(X)^2} - 1\right] = Z$$

value can be determined. Therefore, although a set 100 replication years were run for each assignment distribution regardless of the N value calculated, the actual uncertainty limit achieved in the 100 replication years can be determined by

$$E = \sqrt{\frac{C^2 Z}{N}} \quad .$$

Following the completion of all computer runs, the maximum uncertainty limits of SAR on-scene hours not satisfied, mission flight hours not performed, extra hours flown and total RONs were determined for each aircraft distribution. These values range from 2.56 to 8.77 per cent and may be found in Appendix A. Statistical significance of the results could then be identified by upper/lower bound comparisons of the data.

1. Operational Effectiveness Results

The following aircraft distributions are ranked in the order of effectiveness from high to low for the ten years studied, FY 75 to FY 84. The vertical lines to the right bound statistically insignificant differences in results at the 95% confidence level.

MISSION EFFECTIVENESS

Aircraft Distributions			Per Cent Flight Hours
CCOD	ECITY	SP-CW	Not Performed
4	4	0	13.91
5	3	0	14.12
3	5	0	14.50
4	0	4	16.03
5	0	3	16.15
3	0	5	16.25
0	3	5	17.21
0	4	4	17.42
0	5	3	17.45
8	0	0	20.15
0	8	0	21.53
0	0	8	23.41

SAR EFFECTIVENESS

Aircraft Distributions			Per Cent On-Scene Hours
CCOD	ECITY	SP-CS	Not Performed
0	3	5	30.53
0	4	4	31.08
3	0	5	31.63
0	5	3	31.82
4	0	4	32.40
0	0	8	32.62
5	0	3	33.81
3	5	0	37.12
4	4	0	37.25
0	8	0	37.39
5	3	0	37.98
8	0	0	41.97

A graph of these results is contained in Appendix A.

2. Cost Results

The costs developed in this study are in undiscounted 1972 dollars. This is not considered to seriously affect the viability of the cost portion of the study because

(a) The significance in the costs lies not in individual totals but in the relative differences of costs between the various aircraft location distributions,

(b) All of the one-time costs will be incurred in the first few years of the program under each alternative,

(c) The only indirect operating cost of a recurring nature will be that due to changes in general service rating complements at CGAS Cape Cod and St. Petersburg-Clearwater, if required, and,

(d) The recurring direct operating costs are only a function of the capability of the HC-130s to meet their operational requirements as determined by their location and are relatively independent of decisions made after the initial assignment distribution is determined.

When addressing the question of costs associated with the different aircraft assignment distributions the statistical significance of differences in the direct operational cost factors is not of key importance. What is important is the total relevant cost differentiations between the various assignment distributions.

a. Procurement and Indirect Operating Costs

The relevant costs, other than direct operating costs of the aircraft, include the following one-time cost estimations made by the Coast Guard in its program budgeting projections:

CGAS Cape Cod	
New Facility Construction	$2,300,000
CGAS Elizabeth City	
New Facility Construction	$2,100,000
St. Petersburg-Clearwater	
Property and Facility Acquisition	$ 750,000
Facility Renovation	1,030,000
New Facility Construction	800,000
	$2,580,000

If two locations are to be used an estimated one-time expenditure of $760,000 will be required to set up a second spare parts inventory and procure the necessary maintenance equipment. In the event a location other than, or in addition to, CGAS Elizabeth City is to be utilized, a complement of twenty-five general service ratings will have to be added to the subject station's personnel complement. This will be a recurring cost over the period of concern. Computed at the Coast Guard cost planning factor of $12,000 per general service rating per year, the ten-year cost for twenty-five general service ratings will be $3,000,000.

Command and control costs other than the general service ratings are not considered to be relevant in the study. This is because command and control personnel presently exist at CGAS Cape Cod and CGAS Elizabeth City. In the case of St. Petersburg-Clearwater, if it is selected

as an HC-130 station site, the Coast Guard plans to close their present CGAS St. Petersburg and transfer its command and control personnel from that station to the new site.

b. Direct Operating Costs

The relevant direct operating costs for this study are considered to be the fuel and maintenance costs of the SAR on-scene, mission, and extra flight hours flown as well as the RON per diem costs. The 1972 fuel and maintenance costs per HC-130 flight hour are $477. In order to arrive at a per diem cost for RONs, the size of the flight crew must be specified and a mean situation as to availability of meals and quarters assumed. The size of a SAR flight crew is assumed to be nine: three officers and six enlisted men. Assuming that the following distribution of meal and quarters availability could be expected,

Available	Proportion
Meals and Quarters	.5
Quarters only	.2
Meals only	.1
Neither	.2

costs of $12.34 per officer and $9.93 per enlisted man were obtained for a total cost of $96.60 per RON per flight crew.

c. Total and Differential Assignment Oriented Costs

The following aircraft distributions are ranked in the order of total ten-year costs relevant to variation in assignment locations from low to high:

Aircraft Distribution				Costs†	
CCOD	ECITY	SP-CS	Non-Direct	Direct	Differential††
0	8	0	$2.1 M	$30.6 M	$0.0 M
0	0	8	5.6	30.7	3.5
8	0	0	5.3	31.6	4.2
0	4	4	8.4	31.4	7.2
0	5	3	8.4	31.5	7.3
0	3	5	8.4	31.5	7.3
3	5	0	8.2	31.9	7.4
4	4	0	8.2	32.2	7.7
5	3	0	8.2	32.3	7.8
3	0	5	11.6	31.7	10.6
4	0	4	11.6	31.9	10.8
5	0	3	11.6	32.0	10.9

†Costs are in 1972 millions of dollars.

††Differential costs are based on minimum cost for assignment of eight HC-130s at CGAS Elizabeth City.

A graph of these costs with operational effectiveness results is contained in Appendix A.

V. SUMMARY OBSERVATIONS

The subject cost-effectiveness study is based on a computer simulation model. Thus, its validity is dependent on that of the model and the method by which it was employed in the study. Simulation models can only model significant portions of the complex system they are intended to portray. The model developed for this study is no different; its simplifying assumptions, both explicit and implicit, limit its true portrayal of the complex HC-130 air operations in COMLANTAREA. For this reason, absolute cost and effectiveness figures produced by the model must be used with caution. However, because observations of the capabilities of varying aircraft assignment distributions to satisfy identical flight requirements were made under identical decision criteria, the relative capabilities of the distributions to satisfy these requirements and their differential costs are meaningful and do, in fact, indicate the relative merits of each distribution.

In exercising the simulation model several characteristics of HC-130 flight operations in COMLANTAREA came to light: some expected, some unexpected. It is important to note, as found during the sensitivity analysis of the simulation model, that the capability of a specific distribution of aircraft to meet the flight requirements imposed on the system is significantly affected by a shifting of the SAR

case location density. This is not a surprising result but it does indicate that if a shift in SAR case activity occurs, a redistribution of aircraft may be necessary to maintain an optimal level of performance.

Also of interest is the fact that with the majority of the SAR workload occurring in the Seventh and Eighth Coast Guard Districts, placing all of the HC-130s at the southern location (St. Petersburg-Clearwater) does not result in the most effective SAR performance. This is caused by the interaction in the system between SAR and non-SAR mission requirements and the fact that the major portion of non-SAR mission requirements exist in the north/central region of COMLANTAREA. Thus, the reduction in SAR performance capability is a result of aircraft non-availability in the southern area caused by HC-130s being sent from that area to perform SAR and non-SAR missions in the north/central region. A similar cause and effect relationship is found for non-SAR mission effectiveness when all of the HC-130s are assigned to the northern location--CGAS Cape Cod.

Observation of the SAR on-scene flight hour completion percentages emphasizes the fact that demands on the system are significantly beyond its operational capability. This leads to the conclusion that if the Coast Guard is to more adequately respond to requirements for fixed-wing aircraft SAR flight hours, it must either increase its number of fixed-wing aircraft or utilize the proposed MRS aircraft for SAR.

The total cost spread between the aircraft assignment distributions is 10.9 million 1972 dollars for the ten-year period of the study, FY 75 through FY 84. The maximum direct operating cost difference found for the differing assignment distributions is 1.7 million 1972 dollars. This indicates the most significant costs associated with the system will be the initial outlay costs for facility procurement, construction and improvement, and the recurring command and control costs.

As might be expected, changing from a one-air station HC-130 operation at CGAS Elizabeth City to either a single-station operation at another air station or to a two-station HC-130 operation will be costly. The minimum ten-year differential cost for any change in the location of COMLANTAREA HC-130s will be $3.5M and the maximum could be $10.9M. It is particularly significant to note that a major portion of these differential costs must be incurred during the first few years of operation for facility procurement, construction and improvement and for spare parts and maintenance equipment procurement. In the case of shifting to a two-station operation these early program expenditures will run between $4.2M and $7.2M depending on the locations selected.

The results of this study provide the decision-maker with the ability to identify incremental changes in both SAR and non-SAR effectiveness associated with incremental changes in cost caused by changing from a single HC-130

station operation based at CGAS Elizabeth City as follows:

INCREMENTAL PERCENTAGE CHANGES IN EFFECTIVENESS

Aircraft Distribution			Changes			
CCOD	ECITY	SP-CS	SAR	Non-SAR	Costs*	Total/$M**
4	4	0	+0.22%	+9.71%	$7.6M	0.76%/$M
4	0	4	7.97	7.01	10.8	1.38
0	4	4	10.08	5.24	7.2	2.12
0	0	8	7.62	(-)2.40	3.5	1.49
0	3	5	10.96	5.50	7.3	2.25
3	0	5	9.20	6.73	10.7	1.49
3	5	0	0.43	8.96	7.4	1.27
8	0	0	(-)7.32	1.76	4.2	(-)1.32
5	3	0	(-)0.94	9.44	7.8	1.09
5	0	3	5.72	6.86	10.9	1.15
0	5	3	8.90	5.20	7.2	1.96

*Costs in 1972 millions of dollars.

**Total effectiveness change per million dollar cost--SAR and non-SAR effectiveness weighted equally.

The final decision, of course, rests with the decision-maker. The information provided by this study is only one of the inputs that must be considered in the overall decision process. In conjunction with this information the decision-maker must not only weigh the relative importance of each of the main operational functions performed by the COMLANTAREA HC-130s but he must also take into account externalities such as politics, possible base closures by the Department of Defense--CGAS Cape Cod is located at Otis Air Force Base, Massachusetts--and forecasts of future funding capabilities.

Based solely on the cost and effectiveness factors considered by the study and with equal importance being

given to the performance of SAR and non-SAR missions, it is concluded that the assignment of three HC-130 aircraft at CGAS Elizabeth City and five at the St. Petersburg-Clearwater International Airport, reflecting a total incremental effectiveness increase of 2.25% per million dollars invested, would be the optimal cost-effective assignment distribution of eight HC-130s in the U. S. Coast Guard Atlantic Area.

APPENDIX A

FISCAL YEAR FLIGHT HOUR REQUESTS

Fiscal Year	Flight Hours Requested	
	Mission	On-Scene
75	3050	3410
76	3160	3560
77	3290	3740
78	3400	3890
79	3530	4060
80	3650	4240
81	3780	4420
82	3960	4620
83	4100	4820
84	4260	5050
Total	36,180	41,810

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	4
CGAS Elizabeth City	4
St. Petersburg - Clearwater	0

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	320	1190	787	390
76	351	1230	821	403
77	395	1330	851	430
78	414	1380	881	442
79	465	1490	893	455
80	509	1550	928	472
81	565	1690	951	493
82	606	1780	989	509
83	661	1880	1010	525
84	748	2050	1040	546
Total	5,034	15,570	9,151	4,665
Maximum * Uncertainty Limit (%)	8.8	3.1	4.0	3.3

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	4
CGAS Elizabeth City	0
St. Petersburg - Clearwater	4

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	387	994	622	225
76	425	1030	667	236
77	468	1150	685	250
78	492	1170	724	263
79	535	1300	737	276
80	577	1360	778	290
81	640	1480	816	298
82	688	1560	854	308
83	762	1680	858	322
84	832	1820	873	333
Total	5,806	13,544	7,614	2,801
Maximum * Uncertainty Limit (%)	6.7	3.2	4.7	3.5

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	0
CGAS Elizabeth City	4
St. Petersburg - Clearwater	4

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	438	932	542	236
76	460	1000	588	254
77	519	1090	614	264
78	547	1130	625	273
79	565	1230	644	286
80	636	1310	647	300
81	705	1410	704	309
82	728	1510	747	321
83	816	1630	740	334
84	895	1760	782	348
Total	6,309	13,002	6,633	2,925
Maximum * Uncertainty Limit (%)	6.7	3.8	6.8	2.9

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	0
CGAS Elizabeth City	0
St. Petersburg - Clearwater	8

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	635	1010	671	218
76	666	1080	709	234
77	715	1160	738	234
78	762	1200	732	250
79	780	1300	762	259
80	850	1360	801	268
81	921	1480	840	278
82	972	1570	830	289
83	1050	1670	888	301
84	1130	1810	901	307
Total	8,481	13,640	7,872	2,638
Maximum * Uncertainty Limit (%)	6.4	3.5	5.7	3.9

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	0**
CGAS Elizabeth City	3
St. Petersburg - Clearwater	5

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	435	925	543	216
76	466	978	574	230
77	508	1070	590	240
78	528	1110	630	250
79	578	1210	651	259
80	630	1290	656	274
81	680	1390	689	279
82	715	1480	732	294
83	808	1590	752	309
84	883	1720	780	319
Total	6,231	12,763	6,597	2,670
Maximum * Uncertainty Limit (%)	6.8	3.6	5.3	3.3

*At 95% Confidence Level

**Optimal cost-effectiveness distribution of aircraft.

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	3
CGAS Elizabeth City	0
St. Petersburg - Clearwater	5

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	400	962	573	204
76	430	1020	625	217
77	481	1100	641	229
78	504	1140	689	245
79	538	1260	696	254
80	593	1310	733	267
81	653	1440	742	278
82	691	1540	778	285
83	750	1640	792	295
84	845	1800	828	310
Total	5,885	13,212	7,097	2,584
Maximum * Uncertainty Limit (%)	7.0	3.9	6.0	3.9

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	3
CGAS Elizabeth City	5
St. Petersburg - Clearwater	0

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	344	1180	755	400
76	365	1230	785	410
77	418	1320	813	438
78	436	1380	844	448
79	485	1480	858	466
80	543	1540	875	482
81	590	1680	919	499
82	625	1770	948	515
83	681	1880	980	535
84	765	2040	999	553
Total	5,252	15,500	8,776	4,746
Maximum * Uncertainty Limit (%)	7.2	3.6	4.1	3.2

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	8
CGAS Elizabeth City	0
St. Petersburg - Clearwater	0

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	535	1370	1080	437
76	570	1420	1090	455
77	627	1530	1130	483
78	635	1580	1190	495
79	683	1690	1220	520
80	742	1760	1230	535
81	778	1890	1250	552
82	843	2000	1290	565
83	914	2090	1300	584
84	967	2220	1330	601
Total	7,294	17,550	12,110	5,227
Maximum * Uncertainty Limit (%)	5.9	2.9	4.7	3.7

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	5
CGAS Elizabeth City	3
St. Petersburg - Clearwater	0

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	325	1210	851	397
76	365	1260	892	403
77	405	1350	901	434
78	423	1420	936	448
79	466	1520	978	465
80	527	1590	994	482
81	570	1730	1000	500
82	613	1810	1050	515
83	667	1910	1100	524
84	751	2090	1110	554
Total	5,112	15,890	9,812	4,722
Maximum * Uncertainty Limit (%)	7.8	3.3	4.9	3.5

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	5
CGAS Elizabeth City	0
St. Petersburg - Clearwater	3

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	396	1030	720	255
76	434	1100	740	270
77	461	1190	784	285
78	498	1230	792	295
79	543	1360	828	316
80	576	1410	869	329
81	640	1530	875	339
82	696	1630	926	350
83	758	1750	930	362
84	843	1900	973	381
Total	5,845	14,130	8,437	3,182
Maximum * Uncertainty Limit (%)	6.8	3.2	4.9	3.2

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	0
CGAS Elizabeth City	5
St. Petersburg - Clearwater	3

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	445	963	574	272
76	467	1030	610	284
77	509	1120	639	298
78	547	1160	648	307
79	589	1260	669	321
80	643	1340	720	337
81	695	1460	725	346
82	732	1550	748	363
83	803	1650	782	378
84	888	1780	826	396
Total	6,318	13,313	6,941	3,302
Maximum * Uncertainty Limit (%)	6.7	3.8	7.7	3.0

*At 95% Confidence Level

SIMULATION MODEL OUTPUT DATA

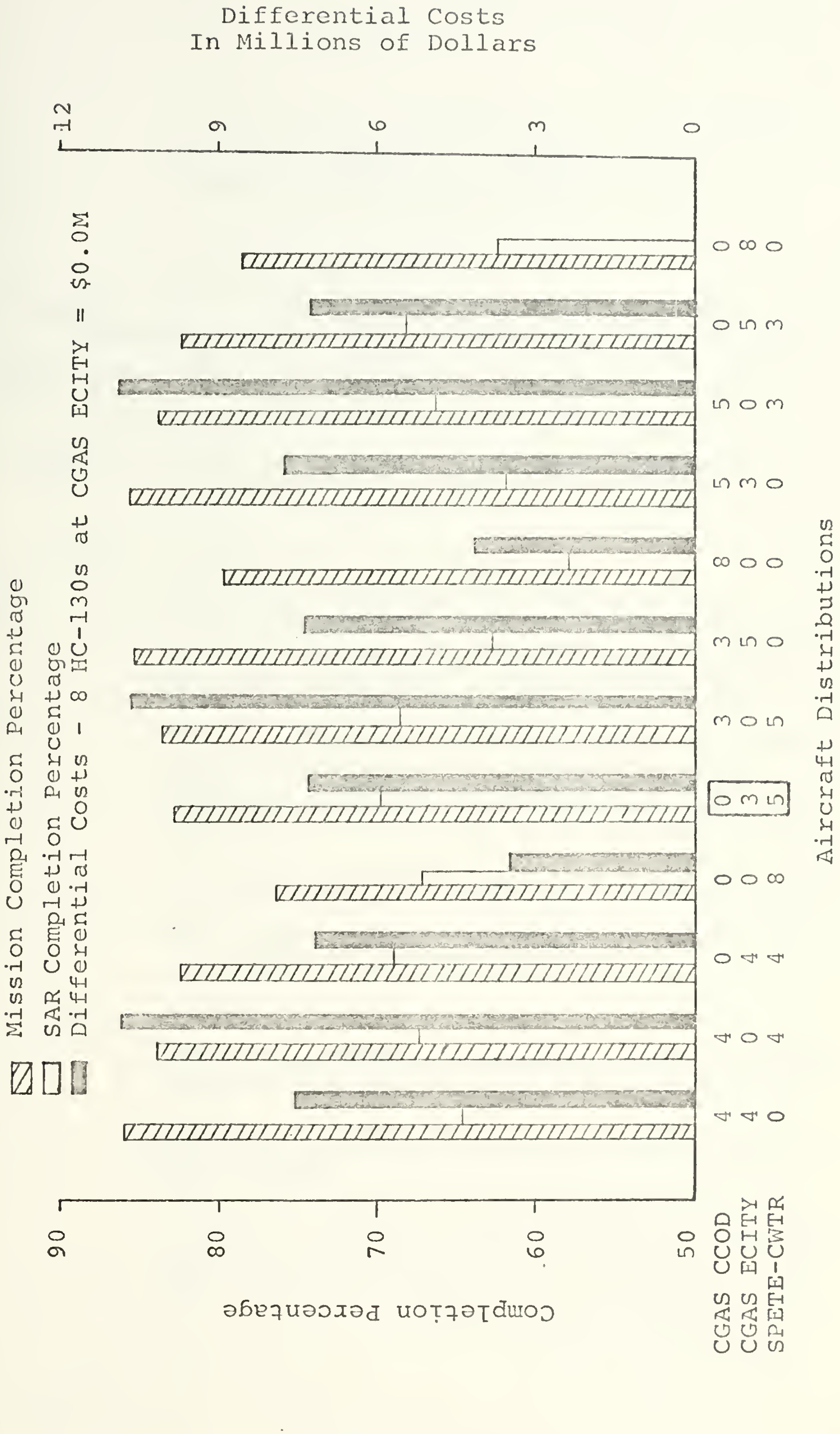
AIRCRAFT DISTRIBUTION:

CGAS Cape Cod	0
CGAS Elizabeth City	8
St. Petersburg - Clearwater	0

Fiscal Year	Mission Flt. Hrs. Lost	On-Scene Flt. Hrs. Lost	Extra Flt. Hrs.	Total RONs
75	569	1210	747	443
76	609	1250	751	455
77	650	1350	801	482
78	686	1400	813	496
79	753	1490	835	510
80	786	1560	857	532
81	834	1700	891	547
82	896	1770	922	567
83	958	1890	914	585
84	1050	2020	985	608
Total	7,791	15,640	8,516	5,225
Maximum * Uncertainty Limit (%)	5.7	3.3	4.7	2.6

*At 95% Confidence Level

DIFFERENTIAL COSTS, SAR AND MISSION COMPLETION PERCENTAGES
VS.
AIRCRAFT ASSIGNMENT DISTRIBUTIONS



APPENDIX B

LISTING OF REQUIRED INPUTS
FOR
PROGRAM VARIABLE PARAMETERS

LISTING IS BY DATA CARD ORDER

ALL REAL AND INTEGER INPUTS ARE RIGHT ADJUSTED TO COLUMNS 10,20,...,70,80 DEPENDING ON NUMBER OF CARD PARAMETER ENTRIES UNLESS OTHERWISE NOTED

THE STANDARD FORTRAN CONVENTION HAS BEEN OBSERVED - VARIABLES WHOSE NAMES BEGIN WITH LETTERS I-N ARE INTEGERS, ALL OTHER VARIABLES ARE REALS

ALL CASES AND MISSIONS ARE ONLY THOSE FOR WHICH THE SERVICES OF A C-130 ARE REQUIRED OR DESIRED

CARD 1 - FORMAT # 7000

NSCPY = NUMBER OF SAR CASES PER YEAR

NNSCPY = NUMBER OF NON-SAR CASES (MISSIONS) PER YEAR

N = TOTAL NUMBER OF REPLICATION YEARS THE PROGRAM SHOULD BE RUN. UNLESS MAKING NON CONFIDENCE LEVEL RUN, SET = 10

NSTUP = NUMBER OF SIMULATION DAYS THAT THE PROGRAM SHOULD BE RUN PRIOR TO GATHERING DATA

NRUNS = NUMBER OF SEPARATE ASSIGNMENT COMBINATIONS TO BE INVESTIGATED IN SUBJECT EXERCISE OF PROGRAM

ALCN = MEAN DISTANCE FROM COAST OF C-130 SAR CASES IN THE ATLANTIC

ALATN = MEAN DISTANCE NORTH OF MAINE OF C-130 SAR CASES WHICH OCCUR NORTH OF MAINE

CARD 2 - FORMAT # 7001

CFA = CORRECTION FACTOR APPLIED TO EXPECTED NUMBER OF SAR CASES DURING PEAK DAYS IN FOUR WEEK PERIOD

CFB = CORRECTION FACTOR APPLIED TO EXPECTED NUMBER OF SAR CASES DURING NON-PEAK DAYS IN FOUR WEEK PERIOD

CFC = CORRECTION FACTOR APPLIED TO EXPECTED NUMBER OF NON-SAR MISSIONS DURING FOUR WEEK PERIOD

SP = PROPORTION OF MISSIONS WHICH ARE SPECIAL; I.E., FOR WHICH ACTION IS INITIATED AT OTHER THAN NORMALLY SCHEDULED TAKE OFF TIMES

IS1 = INITIAL SEED FOR SAR CASE TIME GENERATION.

ODD INTEGER OF 5 TO 9 CHARACTERS

IS2 = INITIAL SEED FOR MISSION TIME GENERATION. ODD INTEGER OF 5 TO 9 CHARACTERS

CARD 3 - FORMAT # 7002

IS3 = INITIAL SEED FOR RANDOM NUMBER GENERATOR USED FOR DETERMINING SAR CASE INFORMATION. ODD INTEGER OF 5 TO 9 CHARACTERS

TCPD(3) = CONDITIONAL PROBABILITY THAT GIVEN A SAR CASE, IT WILL HAVE A CERTAIN PRIORITY
  1 = PRIORITY ONE
  2 = PRIORITY TWO
  3 = PRIORITY THREE

LAC(3) = POTENTIAL C-130 STATION DISTANCES IN NAUTICAL MILES FROM SOUTHERN BASE LINE ALONG THE SIMULATED COAST LINE
  1 = NORTHERN STATION
  2 = CENTRAL STATION
  3 = SOUTHERN STATION

PCSC = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY ONE SAR CASE, IT IS A CONTINUOUS, ON SCENE RELIEF, CASE

CARD 4 - FORMAT # 7005

CDFAA(4) = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY ONE SAR CASE, A CERTAIN NUMBER OF C-130 AIRCRAFT WILL BE REQUIRED
  1 = ONE C-130
  2 = TWO C-130S
  ETC.

CDFAB(3) = SAME AS ABOVE ONLY CONDITIONAL ON A PRIORITY TWO SAR CASE

CDFC = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY THREE SAR CASE ONLY ONE C-130 AIRCRAFT WILL BE REQUIRED

CARD 5 - FORMAT # 7006

PPRI(3) = CONDITIONAL PROBABILITY THAT GIVEN A REGULAR MISSION, IT WILL HAVE A CERTAIN PRIORITY
  1 = PRIORITY ONE
  2 = PRIORITY TWO
  3 = PRIORITY THREE

PHCLD1 = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY ONE MISSION, IT CAN BE HELD PAST THE DESIRED DEPARTURE TIME WITHOUT CANCELLATION

PHCLD2 = SAME AS ABOVE ONLY GIVEN A PRIORITY TWO MISSION

PHCLD = SAME AS ABOVE ONLY GIVEN A SPECIAL, PRIORITY ONE MISSION

PSC = CONDITIONAL PROBABILITY THAT GIVEN A SPECIAL PRIORITY ONE MISSION IT IS A SAR CASE DEPLOYMENT OUTSIDE THE NORMAL OPERATIONAL AREAS

PTAD = CONDITIONAL PROBABILITY THAT GIVEN A PRIOR-

ITY THREE MISSION, ITS DURATION EXCEEDS ONE DAY

CARD 6 - FORMAT # 7007

PNPSC(3) = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY ONE MISSION WHICH IS A DEPLOYED SAR CASE THAT IT WILL REQUIRE A SPECIFIED NUMBER OF C-130 AIRCRAFT
  1 = ONE C-130
  2 = TWO C-130S
  3 = THREE C-130S

PSCL(3) = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY ONE MISSION WHICH IS A DEPLOYED SAR CASE, A PARTICULAR C-130 STATION WILL BE CLOSEST TO THE SCENE
  1 = NORTHERN STATION
  2 = CENTRAL STATION
  3 = SOUTHERN STATION

PSUBM = CONDITIONAL PROBABILITY THAT GIVEN A MISSION WHICH IS NOT A DEPLOYMENT SAR CASE, IT IS OF THE TYPE FOR WHICH A HELICOPTER COULD BE USED IF NECESSARY

IS4 = INITIAL SEED FOR RANDOM NUMBER GENERATOR USED FOR DETERMINING MISSION INFORMATION. ODD INTEGER OF 5 TO 9 CHARACTERS

CARD 7 - FORMAT # 7008

PUP(8) = CONDITIONAL PROBABILITY THAT GIVEN A MISSION WHICH IS NOT A DEPLOYMENT SAR CASE, THE ORIGIN OF THE MISSION IS AT A SPECIFIC LOCATION
  1 = BOSTON
  2 = NORTHERN STATION
  3 = U.S. COAST GUARD ACADEMY
  4 = NEW YORK
  5 = WASHINGTON, D.C.
  6 = NORFOLK
  7 = CENTRAL STATION
  8 = SOUTHERN STATION

CARD 8 - FORMAT # 7009

PUP(9-11) = SAME AS ABOVE
  9 = MIAMI
  10 = NEW ORLEANS
  11 = ANYWHERE ALONG COAST

CARD 9 - FORMAT # 7109

QNDG2(6) = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY TWO MISSION, THE MISSION WILL LAST FOR A SPECIFIC NUMBER OF 12 HOUR TIME PERIODS. (OPERATING HOURS)
  1 = 12 HOURS
  2 = 24 HOURS
  3 = 36 HOURS
  ETC.

CARD 10 - FORMAT # 7010

QNDG3(8) = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY THREE MISSION LASTING MORE THAN ONE DAY, THE MISSION WILL LAST FOR A SPECIFIC NUMBER OF 3 DAY TIME PERIODS. (OPERATING TIME)
1 = 3 DAYS
2 = 6 DAYS
ETC.

CARD 11 - FORMAT # 7011

QNDG3(9-15)= SAME AS ABOVE

CARD 12 - FORMAT # 7012

LCC(1) = DISTANCE OF BOSTON ALONG SIMULATED COAST MEASURED FROM BASE LINE IN NAUTICAL MILES

LCC(3-6) = DISTANCE ALONG SIMULATED COAST MEASURED FROM BASE LINE IN NAUTICAL MILES OF:
3 = U.S. COAST GUARD ACADEMY
4 = NEW YORK
5 = WASHINGTON, D.C.
6 = NORFOLK

CARD 13 - FORMAT # 7013

QNDG1(4) = CONDITIONAL PROBABILITY THAT GIVEN A PRIORITY ONE MISSION, IT WILL LAST FOR A SPECIFIC NUMBER OR PARTIAL NUMBER OF DAYS
1 = ONE DAY
2 = TWO DAYS
ETC.

PMEDIC = CONDITIONAL PROBABILITY THAT GIVEN A SPECIAL, PRIORITY ONE MISSION, IT IS A MEDICAL EVACUATION MISSION

PSSC = CONDITIONAL PROBABILITY THAT GIVEN A SAR CASE WITHIN 300NM OF THE COAST IT IS OF THE TYPE FOR WHICH A HELICOPTER COULD BE USED IF NECESSARY

CARD 14 - FORMAT # 7014

NPN = NUMBER OF C-130 AIRCRAFT ASSIGNED TO NORTHERN C-130 STATION FOR FIRST ASSIGNMENT COMBINATION TO BE INVESTIGATED

NPC = NUMBER OF C-130 AIRCRAFT ASSIGNED TO CENTRAL C-130 STATION FOR FIRST ASSIGNMENT COMBINATION TO BE INVESTIGATED

NPS = NUMBER OF C-130 AIRCRAFT ASSIGNED TO SOUTHERN C-130 STATION FOR FIRST ASSIGNMENT COMBINATION TO BE INVESTIGATED

NOTE: MAX TOTAL C-130 AIRCRAFT THAT CAN BE ASSIGNED = 15

CARD 15 - FORMAT # 7015

SDR(5) = CONDITIONAL PROBABILITY THAT GIVEN A C-130 IS FOUND TO HAVE MECHANICAL DISCREPANCIES FOLLOWING ITS RETURN FROM A FLIGHT, IT WILL BE A SPECIFIC NUMBER OF HOURS UNTIL IT IS REPAIRED
1 = 2 HOURS
2 = 4 HOURS
3 = 8 HOURS
4 = 24 HOURS
5 = 72 HOURS

PPCR = PROBABILITY THAT A C-130 WILL BE FOUND TO HAVE MECHANICAL DISCREPANCIES AFTER LANDING WHICH REQUIRE REPAIR PRIOR TO FURTHER FLIGHT OPERATIONS

IS5 = INITIAL SEED FOR RANDOM NUMBER GENERATOR USED IN DETERMINING IF AN AIRCRAFT IS FOUND TO HAVE MECHANICAL DISCREPANCIES WHEN STARTED UP FOR A FLIGHT AND, IF SO, DETERMINATION OF THE NUMBER OF HOURS TO REPAIR IT

CARD 16 - FORMAT # 7016

PSDWR(4) = CONDITIONAL PROBABILITY THAT GIVEN A C-130 DEVELOPS A MECHANICAL DISCREPANCY DURING A SAR FLIGHT OR FLIGHT BETWEEN STATIONS WHICH REQUIRES IT TO ABORT THE FLIGHT, IT WILL BE A SPECIFIC NUMBER OF HOURS UNTIL IT IS REPAIRED AFTER LANDING
1 = 4 HOURS
2 = 8 HOURS
3 = 24 HOURS
4 = 36 HOURS

PPDIF = PROBABILITY THAT A C-130 WILL DEVELOP A MECHANICAL DISCREPANCY DURING A PARTICULAR HOUR WHILE ON A SAR FLIGHT OR FLIGHT BETWEEN STATIONS WHICH REQUIRES IT TO ABORT THE FLIGHT

CARD 17 - FORMAT # 7017

PPCS = PROBABILITY THAT A C-130 WILL BE FOUND TO HAVE A MECHANICAL DISCREPANCY SUCH THAT IT CAN NOT FLY WHEN STARTED FOR TAKE OFF

SPCF(5) = CONDITIONAL PROBABILITY THAT GIVEN A C-130 IS FOUND TO HAVE A MECHANICAL DISCREPANCY WHEN STARTED FOR TAKE OFF, IT WILL REQUIRE A SPECIFIC NUMBER OF HOURS BEFORE BEING READY FOR FLIGHT
1 = 2 HOURS
2 = 4 HOURS
3 = 8 HOURS
4 = 24 HOURS
5 = 72 HOURS

CARD 18 - FORMAT # 7018

NSNA = NUMBER OF STATIONS WITH HELICOPTERS ATTACHED WITHIN 300NM OF THE AREA COVERED BY THE NORTHERN C-130 STATION

NSCA = SAME AS ABOVE ONLY FOR CENTRAL C-130 STATION

NSSA = SAME AS ABOVE ONLY FOR SOUTHERN C-130

STATION

IS6 = INITIAL SEED FOR RANDOM NUMBER GENERATOR USED IN DETERMINING AVAILABILITY OF HELICOPTERS FOR SUBSTITUTING ON C-130 CASES WHEN REQUIRED. ODD INTEGER OF 5 TO 9 CHARACTERS.

CARDS 19 TO X - FORMAT # 7019
X=18+NUMBER OF STATIONS ENTERED ON CARD 18

NOTE: ALL VALUES ARE INTEGERS RIGHT ADJUSTED TO COLUMNS 5,10,...,55,60

EACH CARD CONTAINS INFORMATION ON ONE STATION WITHIN RANGE OF A PARTICULAR C-130 STATION AREA AND ARE ARRANGED AS FOLLOWS

A. BY C-130 STATION AREA FROM NORTH TO SOUTH

B. WITHIN C-130 STATION AREA WITH THE SOUTHERN MOST HELICOPTER STATION WITHIN HELICOPTER RANGE FIRST

C. SOME HELICOPTER STATIONS MAY BE ENTERED MORE THAN ONCE DUE TO BEING WITHIN HELICOPTER RANGE OF MORE THAN ONE C-130 STATION AREA. MAXIMUM TOTAL STATION ENTRIES ALLOWED = 25 (DUPLICATIONS INCLUDED)

INFORMATION FOR EACH STATION IS ENTERED IN THE FOLLOWING ORDER, BY RIGHT ADJUSTED COLUMNS:

05: NAUTICAL MILES ALONG SIMULATED NORTH/SOUTH COAST LINE FROM BASE LINE

10: NAUTICAL MILES TO RIGHT OR LEFT OF SIMULATED NORTH/SOUTH COAST LINE. DISTANCES RIGHT ARE POSITIVE, DISTANCES LEFT ARE NEGATIVE. STATIONS WITHIN 100NM OF COAST LINE ARE PROJECTED TO THE COAST LINE

15: NUMBER OF HH-3F HELICOPTERS ATTACHED

20: NUMBER OF HH-52A HELICOPTERS ATTACHED

25: =0 (NOT USED)

30: =0 (# OF HH-3FS ON C-130 CASES)

35: NORMAL AVAILABILITY OF HH-3FS X 100 (I.E., 0.40 = ENTRY OF 40)

40: SAME AS ENTRY ABOVE (CURRENT AVAILABILITY OF HH-3FS X 100)

45: =0 (# OF HH-52AS ON C-130 CASES)

50: NORMAL AVAILABILITY OF ONE HH-52A X 100

55: SAME AS ENTRY ABOVE (CURRENT AVAILABILITY OF HH-52AS)

60: NORMAL AVAILABILITY OF TWO HH52-AS X 100

CARDS X+1 TO (END-(NRUNS-1)) - FORMATS # 7020 & # 7021

NOTE: TWO CARDS FOR EACH MONTH

ALL VALUES ARE DECIMALS RIGHT ADJUSTED TO COLUMNS 10,20,...,70,80

INFORMATION IS ENTERED FOR EACH MONTH AS FOLLOWS, BY RIGHT ADJUSTED COLUMNS:

FORMAT # 7020

10: PROPORTION OF TOTAL SAR CASES FOR YEAR WHICH OCCUR DURING SUBJECT MONTH

20: PROPORTION OF TOTAL MISSIONS FOR YEAR WHICH OCCUR DURING SUBJECT MONTH

30: PROPORTION OF SAR CASES DURING THE SUBJECT MONTH WHICH OCCUR ON PEAK SAR DAYS

40: CONDITIONAL PROBABILITY THAT GIVEN A SAR CASE IS IN THE FIRST COAST GUARD DISTRICT, IT IS NORTH OF MAINE

50: PROPORTION OF SAR CASES DURING THE SUBJECT MONTH IN THE FIRST COAST GUARD DISTRICT

60: PROPORTION OF SAR CASES DURING THE SUBJECT MONTH IN THE THIRD AND FIFTH COAST GUARD DISTRICTS

70: PROPORTION OF SAR CASES DURING THE SUBJECT MONTH IN THE SEVENTH AND EIGHTH COAST GUARD DISTRICTS

80: CONDITIONAL PROBABILITY THAT GIVEN A SAR CASE IS IN THE SEVENTH COAST GUARD DISTRICT ATLANTIC AREA, IT IS SOUTH OF A LINE RUNNING BETWEEN THE MIDDLE OF FLORIDA AND PUERTO RICO

FORMAT # 7021

10: CONDITIONAL PROBABILITY THAT GIVEN A SAR CASE IS IN THE SEVENTH OR EIGHTH COAST GUARD DISTRICTS, IT IS IN THE GULF OF MEXICO

20: NUMBER OF PEAK SAR OCCURRENCE RATE DAYS IN WEEK

30: NUMBER OF DAYS IN MONTH

40: PROPORTION OF TIME IN SUBJECT MONTH THAT NORTHERN C-130 STATION WEATHER IS EXPECTED TO BE BELOW INSTRUMENT FLIGHT MINIMUMS

50: SAME AS ABOVE ONLY FOR CENTRAL C-130 STATION

60: SAME AS ABOVE ONLY FOR SOUTHERN C-130 STATION

CARD (END-(NRUNS-1)) - FORMAT # 7022

CONF = NORMAL CRITICAL VALUE CORRESPONDING TO THE LEVEL OF CONFIDENCE DESIRED

ERROR = UNCERTAINTY LIMIT DESIRED

CARDS (END-(NRUNS-2)) TO END - FORMAT # 7023

ONE CARD FOR EACH ADDITIONAL ASSIGNMENT DISTRIBUTION TO BE RUN AFTER INITIAL RUN

N = SAME AS N ON CARD 1

NSTUP = SAME AS NSTUP ON CARD 1

NPN = NUMBER OF C-130 AIRCRAFT ASSIGNED TO NORTHERN C-130 STATION FOR SUBJECT ASSIGNMENT COMBINATION TO BE INVESTIGATED

NPC = NUMBER OF C-130 AIRCRAFT ASSIGNED TO CENTRAL C-130 STATION FOR SUBJECT ASSIGNMENT COMBINATION TO BE INVESTIGATED

NPS = NUMBER OF C-130 AIRCRAFT ASSIGNED TO SOUTHERN C-130 STATION FOR SUBJECT ASSIGNMENT COMBINATION TO BE INVESTIGATED

NOTE: MAX TOTAL C-130 AIRCRAFT THAT CAN BE ASSIGNED = 15

END

STUDY INPUT VALUES
FOR
VARIABLE PARAMETERS

INPUT VALUES ARE LISTED IN THE SAME ORDER
AS FOUND IN THE 'LISTING OF REQUIRED INPUTS
FOR PROGRAM VARIABLE PARAMETERS'; PART ONE OF
APPENDIX B. THE 'LISTING OF REQUIRED INPUTS'
SHOULD BE REFERRED TO FOR EXPLICIT
PARAMETER DEFINITIONS

NSCPY = VARIED DEPENDING ON YEAR BEING STUDIED

NNSCPY = VARIED DEPENDING ON YEAR BEING STUDIED

N = 100 YEARS

NSTUF = 40 DAYS

NRUNS = VARIED DEPENDING ON RUN SET UP DESIRED

ALON = 120 NAUTICAL MILES

ALATN = 50 NAUTICAL MILES

CFA = VARIED DEPENDING ON YEAR BEING STUDIED

CFB = VARIED DEPENDING ON YEAR BEING STUDIED

CFC = VARIED DEPENDING ON YEAR BEING STUDIED

SP = 0.10

IS1 = VARIED WITH DIFFERENT YEARS

IS2 = VARIED WITH DIFFERENT YEARS

IS3 = VARIED WITH DIFFERENT YEARS

TCPD(3) = 0.30 0.40 0.30

LAC(3) = 1850 1350 710

PCSC = 0.15

CDFAA(4) = 0.20 0.50 0.25 0.05

CDFAB(3) = 0.30 0.60 0.10

CDFC = 0.60

PPRI(3) = 0.15 0.35 0.50

PHOLD1 = 0.50

PHOLD2 = 0.50

PHOLD = 0.50

PSC = 0.70

PTAD = 0.10

PNPSC(3) = 0.30 0.60 0.10

```
PSCL(3)    =   0.30   0.30   0.40

PSUBM      =   0.20

IS4        =   VARIED WITH DIFFERENT YEARS

PUP(11)    =   0.04   0.15   0.15   0.04   0.10   0.04
               0.15   0.15   0.04   0.04   0.10

QNDG2(6)   =   0.50   0.20   0.10   0.10   0.05   0.05

QNDG3(15)=     0.10   0.20   0.15   0.10   0.10   0.10
               0.05   0.05   0.025  0.025  0.02   0.02
               0.02   0.02   0.02

LCC(1)     =   1870

LCC(3-6)   =   1750   1670   1480   1380

QNDG1(4)   =   0.20   0.50   0.20   0.10

PMEDIC     =   0.10

PSSC       =   0.50

NPN        =   VARIED WITH AIRCRAFT DISTRIBUTION BEING STUDIED

NPC        =   VARIED WITH AIRCRAFT DISTRIBUTION BEING STUDIED

NPS        =   VARIED WITH AIRCRAFT DISTRIBUTION BEING STUDIED

SDR(5)     =   0.10   0.10   0.30   0.30   0.20

PPDR       =   0.60

IS5        =   VARIED WITH DIFFERENT YEARS

PSDWR(4)   =   0.10   0.50   0.30   0.10

PPDIF      =   0.02

PPDS       =   0.25

SPDF(5)    =   0.25   0.25   0.30   0.15   0.05

NSNA       =   5

NSCA       =   5

NSSA       =   7


NSTA       =

 NORTHERN HC-130 AREA

  STATION    LATI- LONGI-    H-3A   H-52A    H-3A   H-52A   H-52A
   NAME      TUDE   TUDE     ATT.    ATT.     AV.    1AV.    2AV.

  E. CITY     1350    0       4       0       40      0       0
  CAPE MAY    1640    0       0       4        0     70      15
  BROOKLYN    1670    0       0       7        0     95      40
  CAPE COD    1850    0       3       0       30      0       0
  PORTLAND    1955    0       0       3        0     60      10



 CENTRAL HC-130 AREA
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  STATION    LATI-  LONGI-     H-3A   H-52A      H-3A   H-52A   H-52A
   NAME      TUDE    TUDE      ATT.    ATT.       AV.    1AV.    2AV.

  SAVANNAH     950      0        0       3          0     60      10
  E. CITY     1350      0        4       0         40      0       0
  CAPE MAY    1640      0        0       4          0     70      15
  BROOKLYN    1670      0        0       7          0     95      40
  CAPE COD    1850      0        3       0         30      0       0


 SOUTHERN HC-130 AREA

  STATION    LATI-  LONGI-     H-3A   H-52A      H-3A   H-52A   H-52A
   NAME      TUDE    TUDE      ATT.    ATT.       AV.    1AV.    2AV.

  CORPUS       435   -880        0       3          0     60      10
  ST. PETE     555      0        5       2         50     30       5
  MIAMI        595    155        0       5          0     85      30
  NEW ORL.     625   -510        4       0         40      0       0
  HOUSTON      625   -800        0       4          0     70      15
  P. RICO      710   1200        2       0         20      0       0
  SAVANNAH     950      0        0       3          0     60      10


TMONTH    =

                                MONTHS

 ITEMS(*)   1    2    3    4    5    6    7    8    9    10   11   12

    10     .05  .05  .05  .05  .10  .12  .12  .12  .10  .08  .08  .08

    20     .05  .05  .08  .08  .10  .13  .13  .13  .10  .05  .05  .05

    30     .40  .40  .40  .40  .50  .50  .50  .50  .50  .40  .40  .40

    40     .03  .03  .03  .03  .03  .03  .03  .03  .03  .03  .03  .03

    50     .15  .15  .15  .15  .15  .15  .15  .15  .15  .15  .15  .15

    60     .25  .25  .25  .25  .25  .25  .25  .25  .25  .25  .25  .25

    70     .60  .60  .60  .60  .60  .60  .60  .60  .60  .60  .60  .60

    80     .75  .75  .75  .75  .75  .75  .75  .75  .75  .75  .75  .75

    10     .75  .75  .75  .75  .75  .75  .75  .75  .75  .75  .75  .75

    20     2.0  2.0  2.0  2.0  3.0  3.0  3.0  3.0  3.0  2.0  2.0  2.0

    30      31   28   31   30   31   30   31   31   30   31   30   31

    40     .03  .03  .03  .03  .02  .02  .02  .02  .02  .03  .03  .03

    50     .02  .02  .02  .02  .02  .02  .02  .02  .02  .02  .02  .02

    60     .02  .02  .02  .02  .02  .02  .02  .02  .02  .02  .02  .02

      (*)  BY RIGHT ADJUSTED COLUMNS AS SHOWN ON CARDS X+1 TO
           (END-(NRUNS-1)) IN 'LISTING OF REQUIRED INPUTS'


CONF      =   1.96

ERROR     =   0.05
```

APPENDIX C

SENSITIVITY ANALYSIS RESULTS

Parameter Change	Resultant Change (%)			
	Mission Hrs. Lost	On-Scene Hrs. Lost	Extra Flt. Hrs	Total RONs
Increase number of cases per year by 10%	+10.2	+7.3	+2.6	+4.6
Increase offshore mean distance of cases by 10%	+2.0	+2.0	-4.0	+4.3
Increase mean dist. of cases north of Maine by 10%	0.0	0.0	0.0	0.0
Incr. mean priority of SAR cases by 10%	+14.1	+3.6	+7.6	+12.5
Incr. mean district case location north by 10%	+5.0	+7.0	+11.1	+15.1
Incr. mean number of planes req. for pri.1 cases by 10%	+0.9	+3.4	-3.0	+4.7
Incr. mean number of planes req. for Pri.2 cases by 10%	+5.9	+5.5	-2.6	+4.6
Incr. prob. Pri.3 case requires more than one plane 10%	+1.2	+0.9	-5.9	+1.1
Incr. probability SAR case is contin-uous by 10%	+5.4	+1.6	-5.5	+0.7
Increase number of missions per year by 10%	+8.8	+1.8	-10.2	+0.1

SENSITIVITY ANALYSIS RESULTS

Parameter Change	Resultant Change (%)			
	Mission Hrs. Lost	On-Scene Hrs. Lost	Extra Flt. Hrs	Total RONs
Incr. mean priority of missions by 10%	-11.2	+1.3	-3.2	+0.3
Incr. proportion of Pri.1 missions that are SAR cases 10%	+3.3	+1.8	-3.00	+1.3
Incr. proportion of missions that are specials 10%	+1.4	+1.8	-6.4	+3.5
Incr. prob. special mission is a MEDICO by 10%	+4.3	-0.6	-2.0	+1.3
Incr. probability Pri.3 mission more than one day by 10%	+2.6	+0.2	-4.0	+0.6
Incr. probability hold priority one mission by 10%	-1.1	+0.4	-2.3	+2.3
Incr. probability hold priority two mission by 10%	+4.3	+1.3	-4.4	+1.1
Incr. probability hold spec. mission by 10%	+4.2	+0.7	+0.5	+3.0
Incr. probability of maint. down on start up by 10%	+0.8	+2.4	+0.5	+3.5
Incr. mean down time due mech. on start up by 10%	+3.5	+0.8	+0.2	+1.4

SENSITIVITY ANALYSIS RESULTS

Parameter Change	Resultant Change (%)			
	Mission Hrs. Lost	On-Scene Hrs. Lost	Extra Flt. Hrs	Total RONs
Incr. probability abort flight due mech. by 50%	+4.6	+5.6	+3.9	+6.8
Incr. mean down time due abort by 10%	+1.2	+0.9	+0.2	+1.1
Incr. probability of maint. down after landing 10%	+4.0	+3.1	-4.2	+3.5
Incr. mean down time due mech. on landing by 10%	+2.7	+4.1	-0.6	+6.5
Incr. prob. north station below IFR mins. by 10%	-0.1	+1.0	-3.9	+1.9
Incr. prob. central station below IFR, mins. by 10%	+2.4	+1.0	-4.1	+0.6
Incr. prob. south station below IFR mins. by 10%	-2.3	+0.4	-3.8	+1.2
Incr. probability of helo. sub on cases by 10%	-1.8	-0.1	-5.2	+1.9
Incr. probability of helo. sub on missions by 10%	-2.3	+0.9	-4.6	+2.7
Increase helicopter availability at all helo stations 10%	-0.5	-0.2	-2.8	+2.6

APPENDIX D

SIMULATION MODEL EXECUTION PROCEDURES

After reading the variable data inputs as specified by the operator, the simulation generates SAR cases (cases) and non-SAR missions (missions) and prosecutes them during a start-up period, the length of which may be specified by the operator. Following the start-up period, record runs are made and data collected. After the end of the tenth replication year, the number of replication years required to satisfy the confidence and error limits specified by the operator are determined and the simulation then runs to its computed completion. If more than one distribution of aircraft between the same three air stations is to be evaluated in a particular computer run, the program simply reads in the new distribution of aircraft, zeros its tally vectors, reinitiates its random number generator seeds and proceeds as before for the new distribution of aircraft with the same case and mission requirements.

A. CASE AND MISSION OCCURRENCE TIME GENERATION

The first action taken in a time step is to determine if a SAR case call is to be received during the time step. If a case call is to be received, the simulation generates the time for the next case call using exponentially distributed interarrival times. The occurrence rate of calls is dependent on the month and day of the week. During

peak rate days of the week, the occurrence rate is higher than on non-peak rate days and more than one call during a time step can be received. During non-peak rate days a maximum of one case call per time step is permitted. The number of case calls to be received during the current time step are recorded as well as the time step of the next case call to be received.

The simulation next determines whether regular non-SAR mission calls are to be acted on during the current time step. If so, the number of mission calls to be acted on at the time of the next regular mission take-off time, as found during the development of missions for the current time step, are determined using exponentially distributed interarrival times. The mission occurrence rate depends only on the month of the year. Each mission call generated is checked to see whether it is a special mission or not. Special missions are considered to be those that depart upon receipt of the call rather than waiting for a normal take-off time. If the call is a special mission, subroutine MICA is called immediately and the special mission characteristics determined. If the call is simply a regular mission, it is tallied to occur at the next regular mission take-off time. When a mission call time is generated which exceeds the next regular mission take-off time, the next regular mission take-off time which it does not exceed is determined and recorded and mission call generation for the current time step is completed.

B. CASE AND MISSION CHARACTERISTICS GENERATION

At this point the simulation checks to see if there are any case calls being received or any missions to have initial action attempted on them during the current time step. If so, subroutine MICA is called. The function of subroutine MICA is to generate the characteristics for cases and missions. MICA first determines the characteristics of any SAR case calls being received in the current time step. The case priority is determined and, if it is a priority one case, a determination of whether it is a continuous, one-scene relief case--continuous overhead coverage required throughout the case--is made. MICA next determines the case location starting with the district(s) area and further breaking it down until nautical mile coordinates relative to the simulated coast and base lines are determined. If the case is within 300 nautical miles (NM) of any coast line, a determination is made as to whether the case is such that a helicopter could be substituted for an HC-130 if necessary. The straight line distances from each of the three potential HC-130 air station locations are found and the closest station identified. The number of HC-130s required for the case are determined conditioned on the priority of the case. If the case is a continuous on-scene relief case, the total number of desired hours on-scene are determined. If the case is not a continuous on-scene relief case, the earliest possible take-off time for HC-130s is determined conditioned on not

departing earlier than 0600 and to arrive on-scene no later than 1600 which allows two hours of daylight on-scene. This implicitly ignores variations in hours of daylight due to seasons and latitude. The total number of desired hours on-scene and case termination time are then determined conditioned on case priority and available time on-scene per flight. All case information is loaded into a case accounting vector and retained until case termination time.

After handling any cases to be determined, MICA generates the characteristics of any missions requiring initial action during the current time step. MICA first determines the priority of the mission with all special missions being priority one missions. Whether or not the mission can be held beyond its regularly scheduled take-off time is determined conditioned on its priority. If it can be held, the maximum number of hours the mission can be held prior to cancellation are determined. If the mission is a special, a determination is made as to whether or not it is a deployment SAR case (SAR case outside the normal COMLANTAREA HC-130 coverage areas). If it is a deployment SAR case, the number of HC-130s desired and the closest potential HC-130 air station are determined. If the special mission is not a deployment SAR case and cannot be held, it is checked to see if it is a medical evacuation (MEDICO) mission. MICA next determines the point of origin of a regular mission. If the regular mission origin is not at

a primary location or it is a special, MEDICO mission, the pick up point is determined from a uniform distribution along the coasts. Based on the mission origin or pick up point, the distances to all HC-130 air stations are found and the closest station identified. MICA next determines the number of hours the mission will be underway and the flight hours required conditioned on the mission priority. Finally, for other than deployment SAR cases or missions lasting more than two days, a determination is made as to whether a helicopter could be substituted for an HC-130 on the subject mission. All mission information is loaded into a mission accounting vector which is retained until mission completion or cancellation.

C. CASE, MISSION AND AIRCRAFT UPDATE

At this point all cases and missions which may require action during the current time step are in the case and mission accounting vector arrays. The program now looks at all cases to determine if aircraft were on-scene during the previous time step. If so, a number of hours equal to the number of aircraft on-scene are subtracted from the total number of hours requested on-scene.

The simulation next looks at all missions to determine if any are to be completed or if any require assignment of aircraft during the current time step. The mission accounting vector is zeroed for any mission which is terminating and any aircraft assigned to the mission are checked to ensure

that their accounting vectors indicate that they are to return during the current time step. For any missions which require the assignment of aircraft during the current time step, separate mission action vectors are loaded with the mission number, priority, and nearest proposed HC-130 air station.

The HC-130 accounting vector array is then scanned to identify any HC-130s which are returning to air stations, becoming available after maintenance work, or are arriving or departing from any SAR case scene. For HC-130s arriving at an air station after aborting a flight, the accounting vector is zeroed with the exception of its home station, current location station, and the fact that the plane is down. The time step when it will be available is entered as determined at time of abort. The accounting vectors of any HC-130s becoming available after maintenance are zeroed except for their home station and current location station.

For HC-130s arriving or departing from a SAR case scene, the next required take-off time for an HC-130 for the case is determined, if necessary, and the case accounting vector is altered appropriately. The time of departure from scene or time of arrival at destimation air station is determined, as applicable, and the HC-130 accounting vector altered accordingly.

All HC-130s arriving at air stations, other than those from aborted flights, are checked to determine if they have

maintenance discrepancies. If an HC-130 does have a maintenance discrepancy, the number of hours until it will be repaired are determined. If an HC-130 does not have a maintenance discrepancy, it is automatically considered to be down for one hour for refueling. Depending on the situation, the appropriate entries as to air station of arrival and time of availability are entered in the aircraft's accounting vector and all other entries except its home station are zeroed.

The helicopter accounting vector array is then scanned to determine if any helicopters are to return to their home stations from HC-130 cases or missions. If a helicopter is to return, the type of helicopter is ascertained and the affected case or mission accounting vector is altered accordingly. The helicopter station vector is then changed to indicate the helicopter's return and the type helicopter availability increased conditioned on the number of helicopters still on HC-130 cases from that particular station. Finally, the appropriate helicopter action vector is zeroed.

The simulation now scans the HC-130 vector array to find all HC-130s on SAR cases or enroute between air stations. Each HC-130 in either of these statuses is checked to see if it has developed a mechanical discrepancy requiring it to abort its flight. If an HC-130 is required to abort its flight and it is on a case, the appropriate case accounting vector is changed to show that the aircraft

is not assigned to the case any longer. The number of hours the HC-130 will be down after returning to an air station are determined and the closest air station is located. After determining the time enroute to the closest air station at 200 knots, the HC-130 accounting vector is altered to show location of the emergency air station, time of arrival, number of hours down after arrival and its status as "down on arrival."

The program next scans the case accounting vector array to determine any cases which either require assignment of aircraft or are to be completed during the current time step. For cases which are to be completed, the HC-130 accounting vector array is scanned and any HC-130s enroute to scene or on-scene are sent to the stations they departed from, if enroute, or closest station if on-scene. Enroute times are determined and the HC-130 accounting vectors are changed appropriately. The same action is taken for any helicopters assigned to the case. The number of on-scene hours requested but not covered are tallied and the subject case accounting vector is zeroed. For cases which require the assignment of aircraft during the current time step, separate case action vectors are loaded with the case number, priority and nearest proposed HC-130 air station.

D. HC-130 REQUIREMENT AND AVAILABILITY DETERMINATION

The total HC-130 requirements from each proposed HC-130 air station are determined by scanning the mission and case action vectors. Following this determination, if any

HC-130s are required during the current time step the number available must be ascertained. The first step in this process is to determine if any of the air stations are below instrument weather minimums. If they are, the HC-130s at those stations are considered unavailable for the current time step and their accounting vectors altered to reflect this fact. Next, any HC-130 at a station not below weather minimums and in a "ready to fly" status is run up to determine whether, if called, it will be able to fly. Those which are found not able to fly have their accounting vectors changed to indicate "mechanically down if called." Following these determinations a tally is made, by air stations, of HC-130s which are available during the current time step.

E. HC-130 ASSIGNMENT PROCESS

At this point all of the assignment requirements for HC-130s and the number of HC-130s available have been identified for the current time step. The simulation must now allocate the available HC-130s among the case and mission requirements. The assignment process is carried out as follows:

(1) If the number of HC-130s available at each proposed HC-130 air station are sufficient to meet the requirements in the individual air station areas they are assigned within their own areas.

(2) If more HC-130s are required within an air station area than are available within that area an attempt is made to substitute helicopters for HC-130s. If sufficient substitutions are made so that the conditions of item (1) above apply, then the assignment procedure outlined therein is carried out.

(3) After attempting to substitute helicopters, if there are still insufficient HC-130s at each air station to cover individual air station area requirements but the total number of HC-130s available are sufficient to cover all requirements, assignments are made between areas after making as many assignments within areas as possible. Aircraft are never taken from one air station to cover priority three case or mission requirements in another air station area.

(4) If, after attempting helicopter substitutions, there are still insufficient HC-130s available to meet the case and mission requirements for the current time step, assignment of the available HC-130s is made according to the decision rules built into the simulation.

1. Insufficient HC-130 Assignment Decision Rules

In the event of a requirement/availability situation as outlined in item (4) above, the assignment decision rules must be invoked. These decision rules are built into the simulation and can only be changed by reprogramming. The assignment routine under the decision rules is continued until either all priority one and two case and mission requirements have been satisfied or there are no further HC-130s available. The assignment routine under the decision rules attempts, in the following order, to ensure that:

a. Every priority one case has at least one aircraft assigned. If insufficient HC-130s are available to do this, attempts are made to divert HC-130s from other cases according to diversion rules contained in subroutine ASSIGN.

b. Every priority one mission has at least one aircraft assigned.

c. Every priority one case has at least half of the aircraft it requires.

d. Every priority two case has at least one aircraft assigned.

e. Every priority two case has at least half of the aircraft it requires.

f. Every priority two mission has at least one aircraft assigned.

g. Every priority three case has at least one aircraft assigned if an HC-130 is available in the case area.

h. Every priority three mission has at least one aircraft assigned if an HC-130 is available in the area of the mission's origin.

i. Every priority one case has all the aircraft it requires.

j. Every priority one mission has all the aircraft it requires.

k. Every priority two case has all the aircraft it requires.

l. Every priority two mission has all the aircraft it requires.

2. Helicopter Substitution Procedures

If, because of insufficient availability of HC-130s, it is necessary to attempt a helicopter substitution on a case or mission, the main program scans all the cases and missions requiring aircraft to see if they are

potentially substitutable as determined when they were generated in subroutine MICA. If a potentially substitutable case or mission is found in the proper area, subroutine SUB is called. The main program specifies the area of concern and also uses an indicator variable in calling SUB to note whether case(s) and possibly missions are potentially substitutable or if there are mission(s) that are potentially substitutable in the subject area. This reduces the scanning time required for SUB.

Depending on the indicator variable, SUB first identifies all potentially substitutable cases and/or missions in the area specified by case and mission number and loads them in case and mission substitution vector arrays.

Substitutions are initially attempted on cases beginning with the lowest priority first. In each case investigated it is known that the case location is within 300 NM of the coast line. However, it is not known if it is within 300 NM of any helicopter station. Therefore, SUB begins with the southern most helicopter station within range of the HC-130 air station area and determines if the latitude of the case being investigated is within 300 NM of the latitude of the helicopter station, latitude being NM north of the simulated base line. If the latitude distance is never within 300 NM of any helicopter station latitude the case is considered to be non-substitutable and its accounting vector changed accordingly. If the

latitude distance is within 300 NM then the straight line distance between the helicopter station and case is computed to see if it is less than or equal to 300 NM. If so, a substitution is attempted. If not, and the next helicopter station north is not within 300 NM, the case is again considered to be non-substitutable and its accounting vector changed accordingly.

If the case being investigated is found to be within 300 NM of the helicopter station, the station vector is queried to determine whether it has HH-3F helicopters attached and, if so, if one is available for substitution on the case. If either of these questions receives a negative reply, the distance between case and station is checked to see if it is less than or equal to 150 NM. If it is, the station is then queried concerning the availability of two HH-52A helicopters for substitution, one being required to cover the other on an over-water flight. If the reply to this query is in the negative, the next helicopter station north is checked. If a case within range of a helicopter station cannot be substituted on because of helicopter non-availability, its accounting vector is not altered.

If, during this process, a helicopter is available for substitution on the case a helicopter activity vector is loaded to ensure the helicopter's timely return to its home station. In addition, the case vector is changed to reflect the assignment of an aircraft and a reduction in on-scene hours required is made. The helicopter's home

station vector is changed to indicate the type helicopter on an HC-130 case and reduction in availability of that type helicopter at that particular station. If the case does not require any further aircraft during the current time step, its action vector is zeroed. If sufficient HC-130s are available to fill all requirements, the substitution process is terminated. Otherwise the process is continued attempting to assign another helicopter on the present case being investigated, if necessary, or any other potentially substitutable cases and/or missions in the area.

Nearly the same procedures are followed for attempting substitutions on potentially substitutable missions, beginning with the lowest priority first, the only difference being with the assignment of HH-52As. On missions, only one HH-52A need be assigned vice the two required for cases.

3. Insufficient HC-130 Assignment Procedures

When an assignment of aircraft is required under the decision rules outlined in section 2 above, the type of requirement--case or mission, the priority of the requirement and the level of assignment desired are specified by the main program and subroutine ASSIGN is called. ASSIGN scans the case or mission action vector arrays as indicated and locates the cases or missions requiring aircraft under the priority and level of assignment criteria specified. If an HC-130 is required in an area where one is available, action is initiated to make the assignment. In situations

where aircraft are required in areas where HC-130s are not available, the requirements are tallied by areas. After all requirements are tallied, action is initiated to assign the HC-130s closest to the case or mission areas to the individual cases or missions. This process is continued until all assignments of the specified type have been made or there are no further HC-130s available. If the former situation occurs and more HC-130s are available, the main program specifies the next requirement type, priority and level of assignment according to the decision rules and the processing in subroutine ASSIGN is reinitiated.

If no further HC-130s are available and the situation being handled is other than priority one SAR cases without any aircraft assigned, the assignment process is terminated. If there are priority one SAR cases without at least one aircraft assigned, attempts are made to divert HC-130s from other SAR cases in the same areas as the subject cases. The procedure followed in attempting to find HC-130s that can be diverted to the priority one case in question begins with finding the lowest priority case in the same air station area with more than one aircraft assigned. If any or all of the aircraft are HC-130s they are checked to see if they can reach the scene of the priority one case and have at least one hour on-scene. When all conditions are met, the HC-130 is designated as the aircraft to be diverted and action is initiated to transfer the HC-130 to the new case.

4. Selection of HC-130 for Assignment

During the process of allocating HC-130s among cases and missions, either the main program or subroutine ASSIGN will select an air station with aircraft available as the air station to supply the aircraft for the case or mission requirement being satisfied. The final selection of the individual HC-130 to be used is performed by subroutine PLANE. When PLANE is called by either the main program or ASSIGN it is given the air station that is to supply the HC-130 and the air station area in which the case or mission pickup point is located.

Subroutine PLANE initially scans all HC-130 accounting vectors to determine whether an HC-130 at the specified air station is home based at the air station whose area the case or mission is in. If so, the HC-130 is checked to see if it is in a "ready to fly" status. If it is, it is designated as the HC-130 for the case or mission requirement being satisfied. If the HC-130 is found to have a mechanical discrepancy on start-up, as determined earlier in the main program, it is placed in a down status and the number of hours until it is ready for flight are determined. If there are not any HC-130s from the area of action available at the air station which must supply the HC-130, all HC-130s at the station are checked and the first one found "ready to fly" is identified as the HC-130 to be used. This information is then passed back to the calling program or subroutine.

5. Final HC-130 Assignment Action

Once the calling program or subroutine has the specific HC-130 to be used, it calls subroutine FILL with this information and the case or mission to which the aircraft is to be assigned. Subroutine FILL must ensure that all relevant vectors are altered to reflect the appropriate usage of the HC-130 specified. If the HC-130 is being diverted from one case to another, the aircraft's approximate position is ascertained and its time of arrival on-scene calculated. The losing case accounting vector is changed to reflect its loss of an aircraft and the subject HC-130's accounting vector altered appropriately. The time of departure of the next aircraft for the new case is calculated, if required, and the case accounting vector updated. If the new case has as many aircraft as it requires during the current time step, its action vector is zeroed. Control is then returned to the calling program or subroutine.

The process for regular departures on SAR cases primarily the same except that the HC-130 departs from a fixed location station. If the HC-130 is unable to get to the scene of the case and have at least one hour on-scene it is sent, instead, to the closest HC-130 air station to be refueled. The next HC-130 departure time required for the case is determined conditioned on the type of case and time of day. Whether the aircraft can go directly to scene or not, if it departs from other than the air station closest to the scene, the extra flight hours involved are calculated and tallied.

In the situation where HC-130s are being sent on missions, the aircraft and mission accounting vectors are changed to indicate the return time of the aircraft and the fact that it is on the specified mission. The aircraft is considered to be gone, for accounting and operational purposes, until termination of the mission. If the aircraft departs from other than the air station closest to the mission pickup point, the extra flight hours involved are calculated and tallied. If the subject mission has all the aircraft assigned that it requires, the mission action vector is zeroed.

If an HC-130 is being sent from one air station to its home station the enroute time is calculated and its accounting vector changed appropriately. The enroute hours are considered extra flight hours and are tallied accordingly.

F. UNANSWERED REQUIREMENTS RESOLUTION

After all possible helicopter substitutions and HC-130 assignments have been made, the case and mission action vectors are scanned to see if any requirements for aircraft were not filled. For cases which did not receive the required aircraft, new departure times are computed depending on the type and location of the case and time of day.

For mission requirements that were not filled, the specific missions are checked to see if they can be held for a later take-off time. If they cannot be held and no

aircraft have been assigned to them they are cancelled and their required mission flight hours tallied as lost. If they cannot be held but have some aircraft assigned, a new take-off time is not determined for them. In this situation a prorated portion of the mission flight hours is tallied as lost. Missions that can be held have new take-off times computed based on the time of day and maximum number of hours they can be held. If possible, the new take-off times are scheduled for the next regular mission take-off time. The accounting vectors of missions being held are changed to show a reduced number of hours that they can be held and the newly determined take-off time.

G. STATION-TO-STATION SHIFT AND RON DETERMINATION

If, after all required aircraft assignments have been made, an HC-130 is found to be at an air station other than its home station between 0800 and 1500 hours and is in a "ready to fly" status, it is sent to its home station. The plane is identified and subroutine FILL is called to provide for the transfer.

During the 0100 time step the aircraft accounting vectors are scanned and any HC-130 found at an air station other than its home station is considered to be remaining overnight (RON). The RONs are tallied both by the current station of the HC-130 as well as its home air station.

H. TIME STEP COMPLETION

Following the station-to-station shift actions and the RON determinations, all mission and case action vectors are zeroed. All HC-130s that were in a "down if called" or "down due to weather" status are returned to a "ready to fly" status. The total time step counter, time of day, and day of week calendars are updated as required. If the required number of replication years have been completed, the program shifts to calculate and publish its final statistics and, if required, begin start-up runs for the next aircraft distribution.

If the total number of replication years have not been completed, the simulation checks to see if a replication month has been completed. If so, the monthly variable parameters are changed and the statistics for the month just completed are tallied. At the beginning of each March, an HC-130 from the most northern potential HC-130 air station with HC-130s assigned is deployed for the International Ice Patrol and the appropriate tallies of mission and extra flight hours made depending on the aircraft assignment distribution being run. At the beginning of August in each year, the deployed HC-130 is returned from ice patrol to its home station.

At the end of each replication year, the year counter is advanced and the total statistics for the year just completed are gathered. At the end of the tenth year, the number of replication years required to satisfy the

confidence level and level of uncertainty specified by the operator are determined. The simulation then proceeds to complete the required number of replications.

I. SIMULATION OUTPUT

At the conclusion of the required number of replication years, the month and year means of the following statistics are produced:

(1) Time HC-130s down due to mechanical discrepancies.

(2) Mission flight hours not covered.

(3) SAR on-scene flight hours not covered.

(4) Extra flight hours flown.

(5) RONs at each proposed HC-130 air station.

(6) RONs from each proposed HC-130 air station.

(7) Total RONs.

In addition, the following statistics are provided:

(1) Variances of mission flight hours not covered, SAR on-scene hours not covered, extra flight hours flown, and total RONs per year.

(2) Mean numbers of SAR cases, SAR on-scene hours requested, missions, and mission flight hours requested per year.

(3) Mean percentage of total possible flight hours spent in down status per year.

COMPUTER SIMULATION MODEL
OF
HC-130 AIRCRAFT OPERATIONS
IN THE
U. S. COAST GUARD ATLANTIC AREA

BY

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4 AUGUST 1973

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C***********************************************************************
C***********************************************************************
C****                                                               ****
C****                          MAIN PROGRAM                         ****
C****                                                               ****
C***********************************************************************
C***********************************************************************
C
C          THE MAIN PROGRAM IS THE PRIMARY CONTROLLER AND
C          DECISION MAKER OF THE SIMULATION CALLING THE FIVE
C          SEPARATE SUBROUTINES, MICA, SUB, FILL, PLANE, AND
C          ASSIGN AS NECESSARY.  IT PROVIDES THE OVERALL PRO-
C          GRAM SET UP AND PARAMETER INITIALIZATION.  THE
C          MAIN PROGRAM GENERATES THE SAR CASE AND NON-SAR
C          MISSION OCCURRENCE TIMES.  IT CONTINUALLY MONITORS
C          ALL CASES AND MISSIONS INITIATING AND TERMINATING
C          ACTION ON THEM AS REQUIRED.  THE MAIN PROGRAM MON-
C          ITORS THE C-130S, DETERMINES WHEN THEY ARE AVAIL-
C          ABLE, IF THEY ABORT FLIGHTS AND WHAT THEIR STATUS
C          IS AT ALL TIMES.  IT INSURES THAT HELICOPTERS USED
C          ON C-130 CASES AND MISSIONS RETURN TO THEIR STA-
C          TIONS AT THE APPROPRIATE TIMES.  C-130 REQUIRE-
C          MENTS AND AVAILABILITIES ARE DETERMINED BY THE
C          MAIN PROGRAM EACH TIME STEP (HOUR) AND ASSIGNMENTS
C          MADE IN ACCORDANCE WITH THE DECISION RULES.  THE
C          MAIN PROGRAM MAINTAINS THE SIMULATION CALENDAR,
C          ALTERS APPLICABLE PARAMETERS INCLUDING CASE AND
C          MISSION OCCURRENCE RATES AND LOCATION DISTRIBUT-
C          TIONS MONTHLY AND GATHERS AND PUBLISHES ALL STA-
C          TISTICS.  MORE COMPLETE DESCRIPTIONS OF ITS FUNC-
C          TION ARE FOUND, AS REQUIRED, AT THE BEGINNING OF
C          ITS MAJOR SEGMENTS
C
C
C***********************************************************************
C****                    PROGRAM SET UP SEGMENT                     ****
C***********************************************************************
C
      DIMENSION TCPD(3),NCAS(850),CDFAA(4),CDFAB(3),
     1PPRI(3),PNPSC(3),PSCL(3),NMISS(1600),PUP(10),QNDG1(4),
     2QNDG2(6),QNDG3(15)
      DIMENSION NPRM(3),NPRS(3)
      DIMENSION SDR(5),TSDR(5),PSDWR(4),SDWR(4),SPDF(5)
      DIMENSION NRCNA(3),NRCNF(3)
      DIMENSION TMONTH(12,14)
      DIMENSION NONA(3),NONF(3),NDOWT(12),NMHLT(12),
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     1NSHLT(12),XOURST(12),NONAT(12,3),NONFT(12,3),
     2NONAYS(3),NONFYS(3),NONAY(3),NONFY(3),ANONA(3),
     3ANONF(3),NONAS(3),NONFS(3)
      REAL*8 NMHSS,NSHSS,XCSS,NRONSS
      COMMON/INFO1/TCP(3),PCL(3),PCSC,PSCI,PSSC,PCSCU,PCNN,
     1PCGULF,Z,CDFA(4),CDFB(3),CDFC,PRI(3),PHOLD1,PHOLD2,
     2PSC,PPSC(3),PHOLD,PMEDIC,PMSC(3),PPUP(11),PSUBM,
     3QND1(4),QND2(6),QND3(15),PTAD,TSPDF(5),ALON,ALATN
      COMMON/INFO2/IC,NSCTD,NCASE(50,17),NCTS,K,LAC(3),
     1NDAYTI,NM,ID,LOC(9),NSPNST,NNSCTD,NMISSN(100,16),NC
      COMMON/INFO3/NTYPE,NAREA,NSNA,NSCA,NSSA,NSTA(25,12),
     1NFACT(20,6),NTPR,NPRT(3),NTPA,NMISA(20,3),
     2NCASA(10,3),IF,NPA(3)
      COMMON/INFO4/NRTN,NISSN,NACE,NPANE,NPLANE(15,16)
      COMMON/INFO5/IE,NAREAS,NPLUSE,NPIS
      COMMON/INFO6/JPRI,JDEC,NCLOSE
      COMMON/INFO7/DIST,DISTR,XHRST
      COMMON/INFO8/NUMFHR,NUSFHR,NDSC
      EQUIVALENCE (NCASE(1,1),NCAS(1))
      EQUIVALENCE (NMISSN(1,1),NMISS(1))
C
C          READ VALUES FOR VARIABLE INPUT PARAMETERS
C
      READ(5,7000) NSCPY,NNSCPY,N,NSTUP,NRUNS,ALON,ALATN
 7000 FORMAT(5I10,2F10.2)
      READ(5,7001) CFA,CFB,CFC,SP,IS1,IS2
 7001 FORMAT(4F10.2,2I10)
      READ(5,7002) IS3,TCPD(1),TCPD(2),TCPD(3),LAC(1),
     1LAC(2),LAC(3),PCSC
 7002 FORMAT(I10,3F10.2,3I10,F10.2)
      READ(5,7005) CDFAA(1),CDFAA(2),CDFAA(3),CDFAA(4),
     1CDFAB(1),CDFAB(2),CDFAB(3),CDFC
 7005 FORMAT(8F10.2)
      READ(5,7006) (PPRI(J),J=1,3),PHOLD1,PHOLD2,PHOLD,PSC,
     1PTAD
 7006 FORMAT(8F10.2)
      READ(5,7007) (PNPSC(J),J=1,3),(PSCL(L),L=1,3),PSUBM,
     1IS4
 7007 FORMAT(7F10.2,I10)
      READ(5,7008) (PUP(J),J=1,8)
 7008 FORMAT(8F10.2)
      READ(5,7009) PUP(9),PUP(10),PUP(11)
 7009 FORMAT(3F10.2)
      READ(5,7109) (QNDG2(J),J=1,6)
 7109 FORMAT(6F10.2)
      READ(5,7010) (QNDG3(J),J=1,8)
 7010 FORMAT(8F10.2)
      READ(5,7011) (QNDG3(J),J=9,15)
 7011 FORMAT(7F10.2)
      READ(5,7012) LOC(1),(LOC(J),J=3,6)
 7012 FORMAT(5I10)
      READ(5,7013) (QNDG1(J),J=1,4),PMEDIC,PSSC
 7013 FORMAT(6F10.2)
      READ(5,7014) NPN,NPC,NPS
 7014 FORMAT(3I10)
      READ(5,7015) (SDR(M),M=1,5),PPDR,IS5
 7015 FORMAT(6F10.2,I10)
      READ(5,7016) (PSDWR(J),J=1,4),PPDIF
 7016 FORMAT(5F10.2)
      READ(5,7017) PPDS,(SPDF(J),J=1,5)
 7017 FORMAT(6F10.2)
      READ(5,7018) NSNA,NSCA,NSSA,IS6
 7018 FORMAT(4I10)
C
C          SET UP CUMMULATIVE DISTRIBUTION FUNCTION CUTOFFS
C          FOR VARIABLE INPUT PROBABILITY DISTRIBUTIONS
C
      TCP(1)=TCPD(1)
      TCP(2)=TCP(1)+TCPD(2)
      TCP(3)=TCP(2)+TCPD(3)
      CDFA(1)=CDFAA(1)
      CDFA(2)=CDFA(1)+CDFAA(2)
```

```
      CDFA(3)=CDFA(2)+CDFAA(3)
      CDFA(4)=1.0
      CDFB(1)=CDFAB(1)
      CDFB(2)=CDFB(1)+CDFAB(2)
      CDFB(3)=1.0
      PRI(1)=PPRI(1)
      PRI(2)=PRI(1)+PPRI(2)
      PRI(3)=1.0
      PPSC(1)=PNPSC(1)
      PPSC(2)=PPSC(1)+PNPSC(2)
      PPSC(3)=1.0
      PMSC(1)=PSCL(1)
      PMSC(2)=PMSC(1)+PSCL(2)
      PMSC(3)=1.0
      LOC(2)=LAC(1)
      LCC(7)=LAC(2)
      LCC(8)=LAC(3)
      QND1(1)=QNDG1(1)
      QND1(2)=QND1(1)+QNDG1(2)
      QND1(3)=1.0
      SDWR(1)=PSDWR(1)*PPDIF
      SDWR(2)=SDWR(1)+PSDWR(2)*PPDIF
      SDWR(3)=SDWR(2)+PSDWR(3)*PPDIF
      SDWR(4)=PPDIF
      PPUP(1)=PUP(1)
      DO 002 L=2,10
      PPUP(L)=PPUP(L-1)+PUP(L)
  002 CONTINUE
      PPUP(11)=1.0
      QND2(1)=QNDG2(1)
      DO 003 L=2,5
      QND2(L)=QND2(L-1)+QNDG2(L)
  003 CONTINUE
      QND2(6)=1.0
      QND3(1)=QNDG3(1)
      DO 004 L=2,14
      QND3(L)=QND3(L-1)+QNDG3(L)
  004 CONTINUE
      QND3(15)=1.0
      TSDR(1)=SDR(1)*PPDR
      DO 016 I=2,4
      TSDR(I)=TSDR(I-1)+(SDR(I)*PPDR)
  016 CONTINUE
      TSDR(5)=PPDR
      TSPDF(1)=SPDF(1)
      DO 017 I=2,4
      TSPDF(I)=TSPDF(I-1)+SPDF(I)
  017 CONTINUE
      TSPDF(5)=1.0
C
C          TALLY TOTAL NUMBER OF AIR STATIONS WHICH HAVE BEEN
C          SEGREGATED INTO GROUPS CHARACTERIZED BY BEING
C          WITHIN 300 NM OF EACH C-130 STATION AREA.  READ
C          STATION DATA
C
      NTSTA=NSNA+NSCA+NSSA
      DO 018 I=1,NTSTA
      READ(5,7019) (NSTA(I,M),M=1,12)
 7019 FORMAT(12I5)
  018 CONTINUE
C
C          READ AND STORE MONTHLY VARIABLE INPUT PARAMETERS
C
      DO 021 I=1,12
      READ(5,7020) (TMONTH(I,J),J=1,8)
 7020 FORMAT(8F10.2)
      READ(5,7021) (TMONTH(I,J),J=9,14)
 7021 FORMAT(6F10.2)
  021 CONTINUE
C
C          READ CONFIDENCE LIMIT AND UNCERTAINTY LEVEL
C
```

```
      READ(5,7022) CONF,ERROR
 7022 FORMAT(2F10.2)
      NRUN=1
C
C         WRITE VALUES OF SELECTED INPUT PARAMETERS
C
      WRITE(6,9017)
      WRITE(6,9018) NSCPY,(TCPD(J),J=1,3),ALON,ALATN,PSSC
      WRITE(6,9019) (CDFAA(J),J=1,4),(CDFAB(J),J=1,3),CDFC
      WRITE(6,9020) NNSCPY,SP
      WRITE(6,9021) (PPRI(J),J=1,3),PHOLD1,PHOLD2,PHOLD,
     1PSC,PTAD
      WRITE(6,9022) (PNPSC(J),J=1,3),(PSCL(J),J=1,3),PSUBM
      WRITE(6,9023) PUP(1),PUP(7),PUP(2),PUP(8),PUP(3),
     1PUP(9),PUP(4),PUP(10),PUP(5),PUP(11),PUP(6)
      WRITE(6,9024) (QNDG1(J),J=1,4),(QNDG2(J),J=1,6),
     1(QNDG3(J),J=1,15)
      WRITE(6,9025) PPDR,PPDIF,PPDS
      WRITE(6,9026) (SDR(J),J=1,5),(PSDWR(J),J=1,4),
     1(SPDF(J),J=1,5)
      WRITE(6,9027)
      L=1
      LL=1
      M=NSNA
 7510 DO 7520 I=LL,M
      WRITE(6,9028) L,NSTA(I,3),NSTA(I,4),NSTA(I,7),
     1NSTA(I,10),NSTA(I,12)
 7520 CONTINUE
      IF(L.EQ.3) GO TO 7540
      L=L+1
      IF(L.EQ.3) GO TO 7530
      LL=M+1
      M=M+NSCA
      GO TO 7510
 7530 LL=M+1
      M=M+NSSA
      GO TO 7510
 7540 CONTINUE
      WRITE(6,9029)
      DO 7550 I=1,12
      WRITE(6,9030) I,(TMONTH(I,J),J=1,11)
 7550 CONTINUE
      WRITE(6,9031) NSTUP,CONF,ERROR
 7600 WRITE(6,9032) NRUN,NPN,NPC,NPS
C
C         ZERO ALL VECTORS IN CASE ACCOUNTING VECTOR ARRAY
C
      DO 001 I=1,850
      NCAS(I)=0
  001 CONTINUE
C
C         ZERO ALL VECTORS IN MISSION ACCOUNTING VECTOR
C         ARRAY
C
      DO 005 I=1,1600
      NMISS(I)=0
  005 CONTINUE
C
C         ZERO ALL VECTORS IN MISSION ACTION VECTOR ARRAY
C
      DO 006 I=1,20
      NMISA(I,1)=0
      NMISA(I,2)=0
      NMISA(I,3)=0
  006 CONTINUE
C
C         ZERO ALL VECTORS IN CASE ACTION VECTOR ARRAY
C
      DO 007 I=1,10
      NCASA(I,1)=0
      NCASA(I,2)=0
      NCASA(I,3)=0
```

```
  007 CONTINUE
C
C          ZERO ALL VECTORS IN C-130 AIRCRAFT ACCOUNTING
C          VECTOR ARRAY
C
      DO 009 I=1,15
      DO 008 J=1,16
      NPLANE(I,J)=0
  008 CONTINUE
  009 CONTINUE
C
C          INITIALIZE C-130 AIRCRAFT ACCOUNTING VECTORS WITH
C          AIRCRAFT HOME STATION AND FIRST POINT OF DEPARTURE
C          DEPENDING ON THE NUMBER OF C-130S, IF ANY, ATTACH-
C          ED TO EACH OF THE THREE C-130 STATIONS
C
      IF(NPN.EQ.0) GO TO 011
      DO 010 I=1,NPN
      NPLANE(I,1)=1
      NPLANE(I,9)=1
  010 CONTINUE
  011 NNPN=NPN+1
      NNPC=NNPN+NPC-1
      IF(NPC.EQ.0) GO TO 013
      DO 012 I=NNPN,NNPC
      NPLANE(I,1)=2
      NPLANE(I,9)=2
  012 CONTINUE
  013 IF(NPS.EQ.0) GO TO 015
      NNPC=NNPC+1
      NNPS=NNPC+NPS-1
      DO 014 I=NNPC,NNPS
      NPLANE(I,1)=3
      NPLANE(I,9)=3
  014 CONTINUE
  015 CONTINUE
C
C          ZERO HELICOPTER ACTIVITY ACCOUNTING VECTOR ARRAY
C
      DO 020 I=1,20
      DO 019 J=1,6
      NHACT(I,J)=0
  019 CONTINUE
  020 CONTINUE
C
C          CONVERT START UP DAYS AND TOTAL REPLICATION YEARS
C          TO TIME STEP VALUES
C
      NSTUP=NSTUP*24
      NSTUPK=NSTUP
      N=N*8760+NSTUP
C
C          ZERO ACCOUNTING TALLIES NOT EFFECTED DURING START
C          UP RUN
C
      XOURSS=0.0
      NDOWS=0
      NMHLS=0
      NSHLS=0
      NSHLYS=0
      NDOWYS=0
      NMHLYS=0
      XCURYS=0.0
      NMHSS=0.0
      NSHSS=0.0
      XCSS=0.0
      NRONSS=0.0
      DO 022 I=1,3
      NONAS(I)=0
      NONFS(I)=0
      NONAYS(I)=0
      NONFYS(I)=0
```

```
  022 CONTINUE
      DO 024  I=1,12
      NDOWT(I)=0
      NMHLT(I)=0
      NSHLT(I)=0
      XOURST(I)=0.0
      DO 023  M=1,3
      NCNAT(I,M)=0
      NONFT(I,M)=0
  023 CONTINUE
  024 CONTINUE
C
C           INITIALIZE RANDOM NUMBER SEEDS, TALLY TOTAL NUMBER
C           OF C-130S ASSIGNED TO C-130 STATIONS AND SET RAN-
C           DOM NUMBER GENERATOR CONSTANT VALUES
C
      IA=IS1
      IB=IS2
      IC=IS3
      ID=IS4
      IE=IS5
      IF=IS6
      NPIS=NPN+NPC+NPS
      Z=2.328306E-10
      K=16807
C
C           INITIALIZE CALENDER COUNTERS AND VARIABLE VALUES
C           REQUIRED FOR PROGRAM START UP
C
      NCTS=1
      NDAY=1
      NDAYTI=1
      NSPNST=0
      NRTN=0
      NISSN=0
      NACE=0
      NSCTD=0
      NSCT=5
      NRNSCT=8
      NNSCFB=1
      NNPTS=12
      NDAYPT=NNPTS
      NNSCAL=NNPTS-2
      SPECL=(24.0/22.0)*SP
      NNSCTD=0
      NDSC=0
      NSTUPK=NSTUP
C
C           ZERO ACCOUNTING TALLIES EFFECTED DURING START UP
C           RUN WHICH MUST BE ZEROED AGAIN FOLLOWING START UP
C           PERIOD
C
  050 CONTINUE
      DO 060  I=1,3
      NRCNA(I)=0
      NRONF(I)=0
  060 CONTINUE
      NMHRST=0
      NFLYTI=0
      NDOWTI=0
      NUMFHR=0
      NUSFHR=0
      NYEAR=0
      NM=0
      NC=0
      NCSHNC=0
      XHRST=0.0
      NMHLST=0
      NCDSC=0
      NSSMSC=0
      NSPL=0
      NRNSC=0
```

```
C
C         IF JUST BEGINNING START UP RUN, GO TO SET MONTHLY
C         VARIABLE INPUT PARAMETERS.  IF START UP HAS BEEN
C         COMPLETED, GO DIRECTLY TO OCCURRENCE TIME PROGRAM
C         SEGMENT AS MONTHLY VARIABLE INPUT PARAMETERS AND
C         OCCURRENCE RATES HAVE ALREADY BEEN SET
C
      IF(NSTUP.EQ.0) GO TO 100
      GO TO 5700
C
C         CALCULATE OCCURRENCE RATE DETERMINATION FACTORS
C         FOR MONTH BEING ENTERED
C
  080 TSCPFW=TSCPYA/13.0
      IF(NPSDIW.EQ.0) GO TO 095
      AAA=PSCDPD*TSCPFW
      AAA=CFA*AAA
      BAA=FLOAT(NPSDIW*96)/AAA
      IF(NPSDIW.EQ.7) GO TO 098
  095 AAB=(1-PSCDPD)*TSCPFW
      AAB=CFB*AAB
      BAB=FLOAT((7-NPSDIW)*96)/AAB
  098 AB=TMPYA/13.0
      AB=CFC*AB
      BB=672.0/AB
C
C
C***************************************************************
C****            OCCURRENCE TIME PROGRAM SEGMENT           ****
C***************************************************************
C
C         THE FUNCTION OF THE OCCURRENCE TIME SEGMENT IS TO
C         GENERATE THE SAR CASE AND NON-SAR MISSION OCCUR-
C         RENCE TIMES.  IN THE INSTANCE OF SAR CASES, CASE
C         OCCURRENCE RATES ARE DEPENDENT ON WHAT PORTION OF
C         THE WEEK THE PROGRAM IS IN; PEAK SAR OCCURRENCE
C         DAYS OR ROUTINE SAR OCCURRENCE DAYS FOR THE PAR-
C         TICULAR MONTH THE PROGRAM IS IN.  IN THE INSTANCE
C         OF MISSIONS, THE PROGRAM DIFFERENTIATES BETWEEN
C         REGULAR MISSIONS AND SPECIAL MISSIONS (THOSE THAT
C         ARE TO DEPART AT TIME OF CALL RATHER THAN NECES-
C         SARILY A REGULAR MISSION SCHEDULED TAKE OFF TIME).
C         FOR REGULAR MISSIONS, THE NUMBER OF MISSIONS TO BE
C         INITIATED IN THE NEXT STANDARD TAKE OFF TIME ARE
C         DETERMINED AT THE SAME TIME.  IF, DURING THE SE-
C         QUENCE OF DETERMINING REGULAR MISSIONS, A SPECIAL
C         MISSION IS ENCOUNTERED ITS CHARACTERISTICS ARE DE-
C         VELOPED IMMEDIATELY IN SUBROUTINE MICA AND THEN
C         THE PROCESS IS CONTINUED UNTIL ALL REGULAR MIS-
C         SIONS FOR THE NEXT REGULAR MISSION TAKE OFF TIME
C         HAVE BEEN DETERMINED.
C
C
C
C
C         IF A CASE CALL IS NOT BEING RECEIVED THIS TIME
C         STEP GO TO DETERMINE IF A MISSION OR MISSIONS ARE
C         TO BE INITIATED THIS TIME STEP - OTHERWISE CONTIN-
C         UE AND REGISTER FACT THAT A CASE IS TO BE DEVELOP-
C         ED THIS TIME STEP
C
  100 IF(NSCT.NE.NCTS) GO TO 200
      NSCTD=0
  105 NSCTD=NSCTD+1
C
C         IF NOT ON A PEAK RATE CASE DAY GO TO TALLY A NON-
C         PEAK RATE CASE
C
      IF(NDAY.GT.NPSDIW) GO TO 107
C
C         ON A PEAK RATE CASE DAY SO TALLY A PEAK RATE CASE
C
      NSSMSC=NSSMSC+1
```

```
      GO TO 108
  107 NODSC=NODSC+1
  108 CONTINUE
      IA=IA*K
      RX=0.5+FLOAT(IA)*Z
C
C          DETERMINE NUMBER OF TIME STEPS UNTIL NEXT CASE AT
C          OCCURRENCE RATE WHICH CORRESPONDS TO TYPE DAY AND
C          MONTH THE PROGRAM IS IN;  PEAK RATE OR NON-PEAK
C          RATE CASE DAY
C
      IF(NDAY.GT.NPSDIW) GO TO 110
      NSNSC=-BAA*ALOG(RX)
      GO TO 120
  110 NSNSC=-BAB*ALOG(RX)
C
C          IF NUMBER OF TIME STEPS UNTIL NEXT CASE IS FOUND
C          TO BE LESS THAN ONE AND ON A NON-PEAK RATE DAY,
C          MAKE THE TIME STEPS TO NEXT CASE EQUAL TO ONE,
C          OTHERWISE INCREASE NUMBER OF CASES TO BE DEVELOPED
C          THIS TIME STEP BY ONE AND DETERMINE TIME STEPS UN-
C          TIL NEXT CASE OCCURRENCE
C
  120 IF(NSNSC.EQ.0) GO TO 121
      GO TO 123
  121 IF(NDAY.LE.NPSDIW) GO TO 105
      NSNSC=1
C
C          RECORD TIME STEP OF NEXT CASE OCCURRENCE
C
  123 NSCT=NSNSC+NCTS
C
C          IF REGULAR MISSIONS ARE TO BE DEVELOPED AND IN-
C          ITIAL ACTION TO BE TAKEN THIS TIME STEP THEN CON-
C          TINUE TO DETERMINE TIME OF NEXT MISSION OCCURRENCE
C          - IF NOT GO TO DETERMINE WHETHER SUBROUTINE MICA
C          MUST BE CALLED OR NOT
C
  200 IF(NRNSCT.NE.NCTS) GO TO 300
C
C          RECORD THE NUMBER OF REGULAR MISSIONS TO BE DEVEL-
C          OPED AND INITIATED THIS TIME STEP AS FOUND DURING
C          THE LAST TIME STEP IN WHICH REGULAR MISSIONS WERE
C          TO BE DEVELOPED AND INITIATED.  TALLY THE REGULAR
C          MISSION, ZERO THE COUNTER FOR REGULAR MISSIONS TO
C          BE DEVELOPED AND INITIATED DURING THE NEXT REGULAR
C          TAKE OFF TIME, RECORD THE TIME STEP OF THE NEXT
C          REGULAR MISSION TAKE OFF TIME IN WHICH A MISSION
C          IS TO BE PERFORMED AS FOUND EARLIER.
C
      NNSCTD=NNSCFB
      NRNSC=NRNSC+NNSCFB
      NNSCFB=0
      NPTS=NNPTS
C
C          IF THE TIME STEP OF THE MISSION CALL IS GREATER
C          THAN THE NEXT REGULAR MISSION TAKE OFF TIME WITH
C          MISSION(S) TO BE PERFORMED GO TO DETERMINE THE
C          NEXT REGULAR MISSION TAKE OFF TIME AFTER THE TIME
C          STEP OF THE REGULAR MISSION CALL BEING CONSIDERED
C          OTHERWISE, CONTINUE
C
  210 IF(NNSCAL.GT.NPTS) GO TO 240
  220 IB=IB*K
      RX=0.5+FLOAT(IB)*Z
C
C          DETERMINE WHETHER THE MISSION CALL BEING CONSIDER-
C          ED IS A SPECIAL MISSION OR NOT, IF SO, GO TO SPE-
C          CIAL MISSION SECTION - OTHERWISE, CONTINUE
C
      IF(RX.LT.SPECL) GO TO 230
C
```

```
C           HAVE A REGULAR MISSION TO BE INITIATED AT THE NEXT
C           REGULAR MISSION TAKE OFF TIME, RECORD TIME STEP
C           WHEN NEXT REGULAR MISSION(S) ARE TO BE DEVELOPED
C           AND INITIATED.  INCREASE TALLY FOR MISSIONS TO BE
C           INITIATED AT NEXT REGULAR TAKE OFF TIME AND DETER-
C           MINE NUMBER OF TIME STEPS UNTIL NEXT MISSION CALL
C
      NRNSCT=NPTS
      NNSCFB=NNSCFB+1
      IB=IB*K
      RX=0.5+FLOAT(IB)*Z
      NSNNSC=-BB*ALOG(RX)
C
C           IF NUMBER OF TIME STEPS TO NEXT MISSION CALL NOT
C           AT LEAST ONE, MAKE IT EQUAL TO ONE
C
      IF(NSNNSC.EQ.0) GO TO 221
      GO TO 222
  221 NSNNSC=1
C
C           RECORD TIME STEP OF MISSION CALL AND GO TO DETER-
C           MINE IF IT IS PRIOR TO NEXT REGULAR MISSION TAKE
C           OFF TIME BEING CONSIDERED OR NOT
C
  222 NNSCAL=NNSCAL+NSNNSC
      GO TO 210
C
C           HAVE A SPECIAL MISSION.  RECORD TIME STEP OF ITS
C           CALL AND THUS ITS TIME OF ACTION AND TALLY EITHER
C           A SPECIAL MISSION OR REGULAR MISSION DEPENDING ON
C           WHETHER THE TIME STEP OF THE CALL IS THE SAME AS
C           A REGULAR MISSION TAKEOFF TIME
C
  230 NSPNST=NNSCAL
      IF(NNSCAL.EQ.NPTS) GO TO 232
      NSPL=NSPL+1
      GO TO 234
  232 NRNSC=NRNSC+1
C
C           DETERMINE NUMBER OF TIME STEPS UNTIL THE NEXT MIS-
C           SION CALL INSURING THE VALUE IS EQUAL TO OR GREAT-
C           ER THAN ONE AND RECORD THE TIME STEP OF THE NEXT
C           MISSION CALL
C
  234 IB=IB*K
      RX=0.5+FLOAT(IB)*Z
      NSNNSC=-BB*ALOG(RX)
      IF(NSNNSC.EQ.0) GO TO 236
      GO TO 238
  236 NSNNSC=1
  238 NNSCAL=NNSCAL+NSNNSC
C
C           CALL SUBROUTINE MICA WITH THE TIME OF THE SPECIAL
C           MISSION CALL TO HAVE THE MISSION DEVELOPED IMMED-
C           IATELY
C
      CALL MICA
C
C           THE SPECIAL MISSION HAS BEEN DEVELOPED AND ITS
C           MISSION VECTOR LOADED.  GO TO HANDLE THE MISSION
C           CALL WHICH WAS GENERATED JUST PRIOR TO CALLING
C           SUBROUTINE MICA TO DEVELOP THE SPECIAL MISSION
C
      GO TO 210
C
C           THE TIME STEP OF THE MISSION CALL JUST GENERATED
C           IS GREATER THAN THE TIME STEP OF THE REGULAR MIS-
C           SION TAKE OFF TIME FOR WHICH MISSIONS ARE BEING
C           TABULATED FOR DEVELOPMENT.  DETERMINE THE NEXT
C           REGULAR MISSION TAKE OFF TIME STEP IMMEDIATELY
C           FOLLOWING THE TIME STEP OF THE MISSION CALL JUST
C           GENERATED
```

```
C
  240 NDUMA=NNSCAL-NPTS
      IF(NDAYPT.EQ.12) GO TO 250
      IF(NDUMA.LE.4) GO TO 241
      IF(NDUMA.LE.24) GO TO 242
      IF(NDUMA.LE.28) GO TO 243
      IF(NDUMA.LE.48) GO TO 244
      IF(NDUMA.LE.52) GO TO 245
      IF(NDUMA.LE.72) GO TO 246
      IF(NDUMA.LE.76) GO TO 247
      IF(NDUMA.LE.96) GO TO 248
      NNPTS=NNPTS+100
      GO TO 270
  241 NNPTS=NNPTS+4
      GO TO 270
  242 NNPTS=NNPTS+24
      GO TO 260
  243 NNPTS=NNPTS+28
      GO TO 270
  244 NNPTS=NNPTS+48
      GO TO 260
  245 NNPTS=NNPTS+52
      GO TO 270
  246 NNPTS=NNPTS+72
      GO TO 260
  247 NNPTS=NNPTS+76
      GO TO 270
  248 NNPTS=NNPTS+96
      GO TO 260
  250 IF(NDUMA.LE.20) GO TO 251
      IF(NDUMA.LE.24) GO TO 252
      IF(NDUMA.LE.44) GO TO 253
      IF(NDUMA.LE.48) GO TO 254
      IF(NDUMA.LE.68) GO TO 255
      IF(NDUMA.LE.72) GO TO 256
      IF(NDUMA.LE.92) GO TO 257
      IF(NDUMA.LE.96) GO TO 258
      NNPTS=NNPTS+116
      GO TO 260
  251 NNPTS=NNPTS+20
      GO TO 260
  252 NNPTS=NNPTS+24
      GO TO 270
  253 NNPTS=NNPTS+44
      GO TO 260
  254 NNPTS=NNPTS+48
      GO TO 270
  255 NNPTS=NNPTS+68
      GO TO 260
  256 NNPTS=NNPTS+72
      GO TO 270
  257 NNPTS=NNPTS+92
      GO TO 260
  258 NNPTS=NNPTS+96
      GO TO 270
  260 NDAYPT=8
      GO TO 280
  270 NDAYPT=12
C
C           IF THERE HAVE NOT BEEN ANY REGULAR MISSIONS RE-
C           CORDED FOR THE NEW REGULAR MISSION STANDARD TAKE
C           OFF TIME JUST DEVELOPED RECORD THE TIME STEP OF
C           THE TAKE OFF TIME AND GO TO DETERMINE IF MORE MIS-
C           SION CALLS RECEIVED PRIOR TO THE TAKE OFF TIME -
C           OTHERWISE, CONTINUE
C
  280 IF(NNSCFB.GT.0) GO TO 300
      NPTS=NNPTS
      GO TO 220
C
C           IF THERE ARE MISSIONS OR CASES TO BE DEVELOPED
C           THIS TIME STEP CALL SUBROUTINE MICA TO DEVELOP
```

```
C          THEM - OTHERWISE, GO TO UPDATE CASE REQUIRED ON-
C          SCENE HOUR TIMES
C
  300 IF(NNSCTD.EQ.0) GO TO 305
      CALL MICA
  305 IF(NSCTD.EQ.0) GO TO 317
      CALL MICA
C
C          UPDATE CASE REQUIRED HOURS ON-SCENE.  IF A CASE
C          HAS C-130S ON-SCENE, REDUCE THE NUMBER OF REQUIRED
C          ON-SCENE HOURS FOR THE CASE BY THE NUMBER OF
C          C-130S ON-SCENE
C
  317 DO 318 I=1,50
      IF(NCASE(I,1).EQ.0) GO TO 320
      IF(NCASE(I,17).GT.0) GO TO 316
      GO TO 318
  316 NCASE(I,8)=NCASE(I,8)-NCASE(I,17)
  318 CONTINUE
C
C
C*********************************************************************
C****  MISSION UPDATE AND ACTION DETERMINATION SEGMENT  ****
C*********************************************************************
C
C          THE FUNCTION OF THE MISSION UPDATE AND ACTION DE-
C          TERMINATION SEGMENT IS TO A) IDENTIFY MISSIONS
C          WHICH ARE TO BE COMPLETED DURING CURRENT TIME STEP
C          AND B) TO IDENTIFY MISSIONS WHICH REQUIRE C-130S
C          TO BE LAUNCHED DURING CURRENT TIME STEP.  FOR MIS-
C          SIONS TERMINATING, THE MISSION ACCOUNTING VECTOR
C          IS REMOVED, FOR MISSIONS REQUIRING C-130S, MISSION
C          ACTION VECTORS ARE LOADED
C
C
C          SET THE MISSION ACTION VECTOR COUNTER TO ONE
C
  320 JJ=1
C
C          DETERMINE WHICH MISSIONS ARE TO BE COMPLETED AND
C          WHICH MISSIONS REQUIRE C-130S THIS TIME STEP AND
C          GO TO THE APPROPRIATE AREA TO TAKE THE PROPER
C          STEPS NECESSARY
C
      DO 348 J=1,100
  324 IF(NMISSN(J,1).EQ.0) GO TO 352
      IF(NMISSN(J,9).EQ.NCTS) GO TO 344
      IF(NMISSN(J,10).EQ.NCTS) GO TO 328
      GO TO 348
C
C          HAVE A MISSION WHICH IS COMPLETED THIS TIME STEP.
C          LOCATE ALL C-130S ON THE SUBJECT MISSION AND IN-
C          SURE THAT THEIR ACCOUNTING VECTORS REFLECT THE
C          FACT THAT THEY ARE TO RETURN FROM THE MISSION DUR-
C          ING THIS TIME STEP
C
  328 DO 330 L=1,NPIS
      IF(NPLANE(L,7).EQ.NMISSN(J,16)) GO TO 329
      GO TO 330
  329 NPLANE(L,4)=NCTS
      NPLANE(L,2)=7
  330 CONTINUE
C
C          REMOVE THE MISSION BEING COMPLETED THIS TIME STEP
C          FROM THE MISSION ACCOUNTING VECTOR ARRAY
C
      DO 340 L=J,100
      IF(NMISSN(L+1,1).EQ.0) GO TO 342
      DO 336 M=1,16
      NMISSN(L,M)=NMISSN(L+1,M)
  336 CONTINUE
  340 CONTINUE
```

```
 342 DO 343 M=1,16
     NMISSN(L,M)=0
 343 CONTINUE
     GO TO 324
C
C          HAVE A MISSION WHICH INDICATES THAT IT REQUIRES A
C          C-130 THIS TIME STEP.  BE SURE IT DOESN'T HAVE ALL
C          THE AIRCRAFT IT NEEDS - IF IT DOES, SKIP IT, IF IT
C          DOESN'T, LOAD THE FIRST OPEN MISSION ACTION VECTOR
C          WITH THE SUBJECT MISSION'S LOCATION IN THE MISSION
C          ACCOUNTING VECTOR ARRAY, ITS PRIORITY, AND THE
C          CLOSEST C-130 STATION TO ITS PICK-UP POINT.  IN-
C          CREASE THE MISSION ACTION VECTOR COUNTER BY ONE
C
 344 IF(NMISSN(J,11).GE.NMISSN(J,7)) GO TO 348
     NMISA(JJ,1)=J
     NMISA(JJ,2)=NMISSN(J,1)
     NMISA(JJ,3)=NMISSN(J,6)
     JJ=JJ+1
 348 CONTINUE
 352 JJ=JJ-1
C
C          IF THERE IS MORE THAN ONE MISSION REQUIRING C-130S
C          THIS TIME STEP ORDER THEIR ACTION VECTORS BY PRI-
C          ORITY FROM HIGHEST (1) TO LOWEST (3) PRIORITY.
C          IF NOT, GO TO C-130 UPDATE SEGMENT
C
     IF(JJ.LE.1) GO TO 368
 354 DO 364 M=1,JJ
     IF(NMISA(M+1,2).EQ.0) GO TO 368
     IF(NMISA(M,2).GT.NMISA(M+1,2)) GO TO 356
     GO TO 364
 356 DO 360 L=1,3
     NMISA(JJ+1,L)=NMISA(M,L)
     NMISA(M,L)=NMISA(M+1,L)
     NMISA(M+1,L)=NMISA(JJ+1,L)
     NMISA(JJ+1,L)=0
 360 CONTINUE
     GO TO 354
 364 CONTINUE
 368 CONTINUE
C
C
C***********************************************************************
C****                 C-130 UPDATE PROGRAM SEGMENT                 ****
C***********************************************************************
C
C
C          THE FUNCTION OF THE C-130 UPDATE PROGRAM SEGMENT
C          IS TO IDENTIFY ALL C-130S THAT ARE TO HAVE THEIR
C          STATUS CHANGED, DETERMINE THE NEW STATUS AND CH-
C          ANGE THE AIRCRAFT ACCOUNTING VECTOR AND THE CASE
C          OR MISSION ACCOUNTING VECTOR, IF NECESSARY, TO RE-
C          FLECT THE CHANGE IN AIRCRAFT STATUS
C
C
C          IDENTIFY C-130, IF ANY, REQUIRING STATUS CHANGE
C          THIS TIME STEP
C
     DO 600 I=1,NPIS
     IF(NPLANE(I,4).EQ.0) GO TO 600
     IF(NPLANE(I,4).LE.NCTS) GO TO 500
     GO TO 600
C
C          A C-130 HAS BEEN IDENTIFIED AS REQUIRING A STATUS
C          CHANGE.  DETERMINE THE STATUS IT IS CURRENTLY IN
C          (THIS IMPLIES THE NEW STATUS IT IS TO CHANGE TO)
C          AND GO TO TAKE THE APPROPRIATE STEPS INDICATED
C
 500 IF(NPLANE(I,2).EQ.1) GO TO 505
     IF(NPLANE(I,2).EQ.2) GO TO 510
     IF(NPLANE(I,2).EQ.5) GO TO 520
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      IF(NPLANE(I,2).EQ.6) GO TO 550
      IF(NPLANE(I,2).EQ.7) GO TO 580
      IF(NPLANE(I,2).EQ.4) GO TO 580
      IF(NPLANE(I,2).EQ.8) GO TO 580
C
C          HAVE A C-130 LANDING AT A STATION AFTER ABORTING
C          EITHER A CASE FLIGHT OR A FLIGHT BETWEEN STATIONS.
C          CHANGE ITS ACCOUNTING VECTOR TO INDICATE IT IS IN
C          A DOWN STATUS, THE TIME STEP IT WILL COME BACK UP
C          AND THE C-130 STATION IT IS LOCATED AT.  ZERO ALL
C          OTHER VECTOR ENTRIES EXCEPT HOME STATION AND TALLY
C          DOWN TIME AND FLIGHT TIME
C
  505 NPLANE(I,9)=NPLANE(I,8)
      NPLANE(I,2)=2
      NPLANE(I,4)=NCTS+NPLANE(I,3)
      NDOWTI=NDOWTI+NPLANE(I,3)
      NFLYTI=NFLYTI+NCTS-NPLANE(I,10)
  508 NPLANE(I,3)=0
      NPLANE(I,5)=0
      NPLANE(I,6)=0
      NPLANE(I,7)=0
      NPLANE(I,8)=0
      NPLANE(I,10)=0
      GO TO 600
C
C          C-130 HAS JUST BEEN BROUGHT TO AN UP STATUS FOL-
C          LOWING A MAINTENANCE DOWN.  ZERO ALL OF ITS AC-
C          COUNTING VECTOR EXCEPT HOME STATION AND STATION IT
C          IS AT
C
  510 DO 515 M=2,8
      NPLANE(I,M)=0
  515 CONTINUE
      NPLANE(I,10)=0
      GO TO 600
C
C          C-130 ON A CASE IS ARRIVING ON SCENE.  CHANGE
C          PLANE STATUS AND DETERMINE CASE IT IS ON
C
  520 NPLANE(I,2)=6
      DO 525 J=1,50
      IF(NCASE(J,16).EQ.NPLANE(I,6)) GO TO 530
  525 CONTINUE
C
C          ALTER CASE ACCOUNTING VECTOR TO INDICATE THE C-130
C          ARRIVING ON SCENE AND DETERMINE THE TIME THE C-130
C          MUST DEPART SCENE TO RETURN TO THE STATION IT IS
C          SUPPOSE TO RETURN TO OR BY 1800 WHICHEVER IS
C          EARLIER
C
  530 NCASE(J,17)=NCASE(J,17)+1
      JTTR=(FLOAT(NCASE(J,11+NPLANE(I,8)))/290.0)+0.5
      NTTR=10-((NCTS-NPLANE(I,10))+JTTR)
      NTR=NCTS+NTTR
      IF(NDAYTI+NTTR.GT.18) NTR=NCTS+18-NDAYTI
      IF(NCASE(J,2).EQ.1) GO TO 545
C
C          CASE IS NOT A CONTINUOUS ON-SCENE RELIEF TYPE.
C          ENTER TIME TO DEPART SCENE IN C-130 ACCOUNTING
C          VECTOR.  DETERMINE NEXT REQUIRED C-130 TAKE OFF
C          TIME CONSIDERING WHETHER THE CASE CURRENTLY HAS
C          ALL THE AIRCRAFT ASSIGNED THAT IT REQUIRES AND
C          TIME OF DAY
C
      NPLANE(I,4)=NTR
      IF(NCASE(J,11).LT.NCASE(J,7)) GO TO 540
  539 NCASE(J,9)=NCTS+30-NDAYTI
      GO TO 600
  540 IF(NDAYTI+JTTR.GT.16) GO TO 539
      NCASE(J,9)=NCTS
      GO TO 600
```

```
C
C           CASE IS A CONTINUOUS ON-SCENE RELIEF TYPE.  DETER-
C           MINE TIME NEXT C-130 SHOULD DEPART TO RELIEVE
C           C-130 ARRIVING ON SCENE AND ENTER TIME TO DEPART
C           AT MAX ENDURANCE IN ACCOUNTING VECTOR OF C-130
C           ARRIVING ON SCENE
C
  545 NTNA=NCTS+NTTR-(FLOAT(NCASE(J,11+NCASE(J,6)))/290.0)
     1+0.5
      NCASE(J,9)=NCTS+NTNA
      NPLANE(I,4)=NCTS+NTTR
      GO TO 600
C
C           C-130 IS DEPARTING CASE SCENE.  CHANGE SUBJECT
C           C-130 STATUS AND DETERMINE CASE IT IS ON
C
  550 NPLANE(I,2)=7
      DO 555 J=1,50
      IF(NCASE(J,16).EQ.NPLANE(I,6)) GO TO 560
  555 CONTINUE
C
C           CHANGE CASE ACCOUNTING VECTOR TO REFLECT THE C-130
C           DEPARTING SCENE AND ALSO NOT BEING ASSIGNED TO THE
C           CASE ANY LONGER.  DETERMINE TIME REQUIRED FOR
C           C-130 TO RETURN TO DESTINATION STATION AND ENTER
C           TIME TO RETURN IN ITS ACCOUNTING VECTOR
C
  560 NCASE(J,11)=NCASE(J,11)-1
      NCASE(J,17)=NCASE(J,17)-1
      JTTR=(FLOAT(NCASE(J,11+NPLANE(I,8)))/290.0)+0.5
  575 NPLANE(I,4)=NCTS+JTTR
      GO TO 600
C
C           HAVE A C-130 EITHER RETURNING FROM A CASE, A MIS-
C           SION OR ARRIVING FROM ANOTHER STATION.  ENTER THE
C           STATION IT HAS ARRIVED AT IN ITS ACCOUNTING VECTOR
C
  580 NPLANE(I,9)=NPLANE(I,8)
      IE=IE*K
      RX=0.5+FLOAT(IE)*Z
C
C           DETERMINE IF C-130 HAS A MECHANICAL DISCREPANCY
C           UPON LANDING AND IF SO, HOW MANY HOURS IT WILL BE
C           DOWN
C
      IF(RX.LE.PPDR) GO TO 585
      GO TO 595
  585 DO 590 M=1,5
      IF(RX.LE.TSDR(M)) GO TO 592
  590 CONTINUE
  592 IF(M.EQ.1) NTSD=2
      IF(M.EQ.2) NTSD=4
      IF(M.EQ.3) NTSD=8
      IF(M.EQ.4) NTSD=24
      IF(M.EQ.5) NTSD=72
C
C           C-130 HAS A MECHANICAL DISCREPANCY - CHANGE ITS
C           ACCOUNTING VECTOR TO INDICATE IT IS DOWN AND WHEN
C           IT WILL BE BACK UP.  TALLY THE NUMBER OF HOURS
C           DOWN.  GO TO ZERO REST OF PLANE ACCOUNTING VECTOR
C
      NPLANE(I,4)=NCTS+NTSD
      NPLANE(I,2)=2
      NDOWTI=NDOWTI+NTSD
      GO TO 508
C
C           C-130 DID NOT HAVE A MECHANICAL DISCREPANCY HOW-
C           EVER IT IS DOWN FOR ONE HOUR FOR REFUELING.
C           CHANGE ITS ACCOUNTING VECTOR TO INDICATE THIS.
C           IF IT WAS NOT ON A MISSION TALLY THE FLIGHT HOURS.
C           GO TO ZERO REST OF THE C-130'S ACCOUNTING VECTOR
C
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```
  595 NPLANE(I,4)=NCTS+1
      NPLANE(I,2)=2
      IF(NPLANE(I,7).GT.0) GO TO 508
      NFLYTI=NFLYTI+NCTS-NPLANE(I,10)
      GO TO 508
  600 CONTINUE
C
C
C******************************************************************
C****           HELICOPTER UPDATE PROGRAM SEGMENT               ****
C******************************************************************
C
C            THE FUNCTION OF THE HELICOPTER UPDATE PROGRAM SEG-
C            MENT IS TO IDENTIFY ANY HELICOPTERS WHICH ARE TO
C            DEPART A CASE SCENE OR RETURN TO THEIR STATIONS
C            AFTER COMPLETING SUBSTITUTE ACTION FOR A C-130
C            EITHER ON A CASE OR A MISSION.  IF THERE ARE ANY
C            HELICOPTERS RETURNING THE HELICOPTER ACTION VECTOR
C            IS ZEROED IN THE HELICOPTER ACTION VECTOR ARRAY
C            AND THE HELICOPTER'S HOME STATION ACCOUNTING VEC-
C            TOR IS CHANGED TO REFLECT THE RETURN OF THE HELI-
C            COPTER.  IF THE HELICOPTER IS DEPARTING A CASE
C            SCENE, THE SUBJECT CASE ACCOUNTING VECTOR IS AL-
C            TERED TO REFLECT THIS FACT
C
C
C            IDENTIFY HELICOPTER, IF ANY, WHICH IS EITHER DE-
C            PARTING A CASE SCENE OR RETURNING TO ITS HOME STA-
C            TION AND TAKE THE APPROPRIATE STEPS INDICATED
C
      DO 690 I=1,20
  615 IF(NHACT(I,3).EQ.0) GO TO 695
      IF(NHACT(I,6).EQ.NCTS) GO TO 620
      IF(NHACT(I,3).LE.NCTS) GO TO 635
      GO TO 690
  620 IF(NHACT(I,5).GT.0) GO TO 635
C
C            A HELICOPTER IS DEPARTING A CASE SCENE.  DETERMINE
C            THE CASE IT IS ON
C
      DO 625 J=1,50
      IF(NCASE(J,16).EQ.NHACT(I,4)) GO TO 630
  625 CONTINUE
C
C            CHANGE THE CASE ACCOUNTING VECTOR AND THE HELICOP-
C            TER ACTION VECTOR TO SHOW THE HELICOPTER IS DE-
C            PARTING THE CASE SCENE.  IF THE HELICOPTER IS TO
C            RETURN TO STATION THIS TIME STEP, GO TO TAKE THE
C            APPROPRIATE STEPS - IF NOT, CHECK FOR ANY FURTHER
C            HELICOPTER ACTIVITY TO BE ACTED ON THIS TIME STEP
C
  630 NCASE(J,11)=NCASE(J,11)-1
      IF(NCASE(J,11).LT.0) NCASE(J,11)=0
      NHACT(I,6)=0
      IF(NHACT(I,3).LE.NCTS) GO TO 635
      GO TO 690
C
C            A HELICOPTER IS RETURNING TO ITS HOME STATION.
C            DETERMINE TYPE HELICOPTER RETURNING AND GO TO
C            APPROPRIATE SECTION
C
  635 IF(NHACT(I,1).EQ.5) GO TO 650
C
C            HAVE AN HH-3F RETURNING TO HOME STATION.  CHANGE
C            STATION ACCOUNTING VECTOR TO REFLECT ONE LESS
C            HH-3F ON A C-130 JOB, ALTER STATION HH-3F AVAIL-
C            ABILITY DEPENDING ON NUMBER OF HH-3FS ASSIGNED AND
C            NUMBER ON C-130 JOBS.  GO TO ZERO SUBJECT HELICOP-
C            TER ACTION VECTOR
C
      NSTA(NHACT(I,2),6)=NSTA(NHACT(I,2),6)-1
      IF(NSTA(NHACT(I,2),6).EQ.0) GO TO 645
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```
      IF(NSTA(NHACT(I,2),3).GT.3) GO TO 640
      GO TO 670
  640 NSTA(NHACT(I,2),8)=5
      GO TO 670
  645 NSTA(NHACT(I,2),8)=NSTA(NHACT(I,2),7)
      GO TO 670
C
C           HAVE AN HH-52A RETURNING TO HOME STATION.  CHANGE
C           STATION ACCOUNTING VECTOR TO REFLECT ONE LESS
C           HH-52A ON  A C-130 JOB, ALTER STATION HH-52A
C           AVAILABILITY DEPENDING ON NUMBER OF HH-52AS
C           ASSIGNED AND NUMBER ON C-130 JOBS.  GO TO ZERO
C           SUBJECT HELICOPTER ACTION VECTOR
C
  650 NSTA(NHACT(I,2),9)=NSTA(NHACT(I,2),9)-1
      IF(NSTA(NHACT(I,2),9).EQ.0) GO TO 660
      IF(NSTA(NHACT(I,2),4).GT.3) GO TO 655
      GO TO 670
  655 NSTA(NHACT(I,2),11)=10
      GO TO 670
  660 NSTA(NHACT(I,2),11)=NSTA(NHACT(I,2),10)
      IF(NSTA(NHACT(I,2),4).GT.3) GO TO 665
      NSTA(NHACT(I,2),12)=5
      GO TO 670
  665 NSTA(NHACT(I,2),12)=10
C
C           ZERO HELICOPTER ACTION VECTOR OF HELICOPTER RE-
C           TURNING TO HOME STATION
C
  670 DO 680 MM=1,20
      IF(NHACT(MM+1,1).EQ.0) GO TO 685
      DO 675 LL=1,6
      NHACT(MM,LL)=NHACT(MM+1,LL)
  675 CONTINUE
  680 CONTINUE
  685 DO 686 M=1,6
      NHACT(MM,M)=0
  686 CONTINUE
      GO TO 615
  690 CONTINUE
  695 CONTINUE
C
C
C*************************************************************************
C****          C-130 INFLIGHT ABORT PROGRAM SEGMENT                  ****
C*************************************************************************
C
C           THE FUNCTION OF THE C-130 INFLIGHT ABORT PROGRAM
C           SEGMENT IS TO IDENTIFY ALL THE C-130S WHICH ARE ON
C           CASES OR FLYING BETWEEN STATIONS AND TO DETERMINE
C           IF THEY HAVE EXPERIENCED MECHANICAL DISCREPANCIES
C           IN FLIGHT WHICH REQUIRE THEM TO ABORT THE FLIGHT
C           THEY ARE ON.  IF IT IS FOUND THAT A C-130 MUST
C           ABORT A FLIGHT IT IS DIVERTED FROM ITS APPROXI-
C           MATE POSITION TO THE CLOSEST C-130 STATION.  THE
C           C-130 ACCOUNTING VECTOR IS ALTERED AS WELL AS THE
C           CASE VECTOR, IF THE C-130 IS ON A CASE, TO REFLECT
C           THE CHANGES CAUSED BY THE ABORT.  THE NUMBER OF
C.          HOURS THE C-130 WILL BE DOWN AFTER LANDING ARE
C           ALSO DETERMINED
C
C
C
C           DETERMINE IF ANY C-130S ARE ON CASES OR FLYING BE-
C           TWEEN STATIONS, IF NOT, GO TO CASE UPDATE AND
C           ACTION DETERMINATION SEGMENT - OTHERWISE, CONTINUE
C
      DO 760 I=1,NPIS
      IF(NPLANE(I,2).GT.4) GO TO 700
      GO TO 760
C
C           A C-130 IS ON A CASE OR FLIGHT BETWEEN STATIONS -
C           DETERMINE IF IT HAS DEVELOPED A MECHANICAL DIS-
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```
C          CREPANCY REQUIRING AN ABORT.  IF NOT, CHECK REST
C          OF THE C-130S, IF SO, CONTINUE
C
  700 IE=IE*K
      RX=0.5+FLOAT(IE)*Z
      IF(RX.LE.PPDIF) GO TO 705
      GO TO 760
C
C          C-130 ON CASE OR FLIGHT BETWEEN STATIONS HAS DE-
C          VELOPED A MECHANICAL DISCREPANCY REQUIRING AN
C          ABORT.  DETERMINE NUMBER OF HOURS IT WILL BE DOWN
C          AFTER LANDING AND STORE THIS INFORMATION IN THE
C          C-130'S ACCOUNTING VECTOR
C
  705 DO 710 J=1,4
      IF(RX.LE.SDWR(J)) GO TO 715
  710 CONTINUE
  715 IF(J.EQ.1) NSD=4
      IF(J.EQ.2) NSD=8
      IF(J.EQ.3) NSD=24
      IF(J.EQ.4) NSD=36
      NPLANE(I,3)=NSD
C
C          DETERMINE STATUS OF C-130 AT TIME OF ABORT AND
C          TAKE APPROPRIATE STEPS
C
      IF(NPLANE(I,2).EQ.8) GO TO 756
C
C          C-130 IS ON A CASE, DETERMINE WHICH CASE IT IS ON
C
      DO 720 J=1,50
      IF(NCASE(J,16).EQ.NPLANE(I,6)) GO TO 725
  720 CONTINUE
  725 IF(NPLANE(I,2).GT.5) GO TO 730
C
C          C-130 WAS ENROUTE TO SCENE OF CASE - DETERMINE
C          APPROXIMATE LOCATION AS HALFWAY BETWEEN STATION
C          FROM WHICH IT DEPARTED AND CASE SCENE.  CHANGE
C          C-130 ACCOUNTING VECTOR TO INDICATE RETURNING
C          TO C-130 STATION FROM WHICH IT DEPARTED AND DE-
C          TERMINE FLIGHT TIME TO RETURN AT 200 KNOTS
C
      DIST=FLOAT(NCASE(J,11+NPLANE(I,9)))/2.0
      JTTR=(DIST/200.0)+0.5
      NPLANE(I,8)=NPLANE(I,9)
      GO TO 735
C
C          C-130 WAS EITHER ON SCENE OR RETURNING FROM SCENE.
C          DETERMINE DISTANCE AND FLIGHT TIME TO DESTINATION
C          STATION AT 200 KNOTS USING DISTANCE TO DESTINATION
C          AS ONE HALF THE DISTANCE TO SCENE IF C-130 WAS RE-
C          TURNING FROM SCENE
C
  730 DIST=NCASE(J,11+NPLANE(I,8))
      IF(NPLANE(I,2).EQ.7) DIST=DIST/2.0
      JTTR=(DIST/200.0)+0.5
C
C          ENTER TIME C-130 IS TO ARRIVE AT NEAREST STATION
C
  735 NPLANE(I,4)=NCTS+JTTR
C
C          IF C-130 WAS RETURNING FROM SCENE SKIP CASE UPDATE
C
      IF(NPLANE(I,2).EQ.7) GO TO 755
C
C          C-130 WAS EITHER GOING TO SCENE OR WAS ON-SCENE.
C          DETERMINE TIME NEXT C-130 SHOULD TAKE OFF FOR CASE
C          DEPENDING ON WHETHER IT IS A CONTINUOUS ON-SCENE
C          RELIEF TYPE OR NOT AND TIME OF DAY.  LOAD THIS IN-
C          FORMATION INTO CASE ACCOUNTING VECTOR AND ADJUST
C          VECTOR TO SHOW ONE LESS C-130 ASSIGNED AND, IF
C          C-130 ON SCENE, ONE LESS C-130 ON SCENE
```

```
C
      IF(NCASE(J,2).EQ.1) GO TO 740
      IF(NDAYTI.GE.16) GO TO 745
      TTS=FLOAT(NCASE(J,11+NCASE(J,6)))/290.0
      NTTS=TTS+0.5
      IF(NDAYTI+NTTS.GT.16) GO TO 745
  740 NCASE(J,9)=NCTS
      NCASE(J,11)=NCASE(J,11)-1
      IF(NPLANE(I,2).EQ.6) NCASE(J,17)=NCASE(J,17)-1
      GO TO 755
  745 IF(NPLANE(I,2).EQ.6) NCASE(J,17)=NCASE(J,17)-1
      NCASE(J,11)=NCASE(J,11)-1
      NCASE(J,9)=NCTS+(30-NDAYTI)
      GO TO 755
C
C           C-130 IS ABORTING FLIGHT BETWEEN STATIONS.  IF
C           PLANE HAS FLOWN MORE THAN HALF THE DISTANCE TO THE
C           ORIGINAL DESTINATION C-130 STATION LET IT CONTINUE
C           TO THAT STATION AT 200 KNOTS - OTHERWISE, RETURN
C           IT TO STATION OF DEPARTURE AT 200 KNOTS.  CHANGE
C           C-130'S ACCOUNTING VECTOR AS NECESSARY TO SHOW
C           STATION GOING TO AND TIME OF ARRIVAL
C
  756 JTT=LAC(NPLANE(I,9))-LAC(NPLANE(I,8))
      IF(JTT.LT.0) JTT=-(JTT)
      FTIME=FLOAT(JTT)/290.0
      IF((FTIME/2.0).LT.(NCTS-NPLANE(I,10))) GO TO 757
      NPLANE(I,8)=NPLANE(I,9)
  757 NPLANE(I,4)=((FLOAT(JTT)/2.0)/200.0)+0.5
C
C           CHANGE C-130 ACCOUNTING VECTOR TO SHOW PLANE'S
C           STATUS AS RETURNING FROM A FLIGHT DUE TO MECHANIC-
C           AL DISCREPANCY
C
  755 NPLANE(I,2)=1
  760 CONTINUE
C
C
C***********************************************************************
C****      CASE UPDATE AND ACTION DETERMINATION SEGMENT           ****
C***********************************************************************
C
C           THE FUNCTION OF THE CASE UPDATE AND ACTION DETERM-
C           INATION SEGMENT IS TO IDENTIFY ANY CASES WHICH ARE
C           TO BE TERMINATED OR WHICH REQUIRE A C-130 TO BE
C           LAUNCHED DURING CURRENT TIME STEP.  FOR CASES
C           TERMINATING, THE CASE ACCOUNTING VECTOR IS REMOVED
C           - FOR CASES REQUIRING C-130S, CASE ACTION VECTORS
C           ARE LOADED
C
C
C           SET THE CASE ACTION VECTOR COUNTER TO ONE
C
  380 JJ=1
C
C           DETERMINE WHICH CASES ARE TO BE TERMINATED AND
C           WHICH CASES REQUIRE C-130S THIS TIME STEP AND GO
C           TO THE APPROPRIATE AREA TO TAKE THE PROPER STEPS
C           NECESSARY
C
      DO 408 J=1,50
  384 IF(NCASE(J,1).EQ.0) GO TO 412
      IF(NCASE(J,15).EQ.NCTS) GO TO 388
      IF(NCASE(J,9).EQ.NCTS) GO TO 404
      GO TO 408
C
C           HAVE A CASE WHICH IS TO TERMINATE THIS TIME STEP.
C           LOCATE ALL C-130S ON SUBJECT CASE
C
  388 DO 391 L=1,NPIS
      IF(NPLANE(L,6).EQ.NCASE(J,16)) GO TO 389
      GO TO 391
```

```
C
C         ONE OF THE C-130S ON THE CASE THAT IS BEING TERM-
C         INATED HAS BEEN LOCATED.  IF IT IS RETURNING FROM
C         CASE THERE IS NO NEED TO ALTER ITS ACCOUNTING VEC-
C         TOR SO CHECK FOR OTHER C-130S ON SAME CASE.  IF IT
C         IS GOING TO THE SCENE OR IS ON SCENE, DETERMINE
C         FLIGHT TIME TO RETURN TO STATION IT TOOK OFF FROM
C         IF ENROUTE TO SCENE FIGURING HALF THE DISTANCE TO
C         THE SCENE OR TO CLOSEST STATION IF ON-SCENE.
C         ALTER THE C-130 ACCOUNTING VECTOR TO SHOW DESTIN-
C         ATION, THAT IT IS RETURNING, AND TIME TO ARRIVE
C
  389 IF(NPLANE(L,2).EQ.1) GO TO 391
      IF(NPLANE(L,2).EQ.7) GO TO 391
      IF(NPLANE(L,2).EQ.5) GO TO 390
      DISTH=FLOAT(NCASE(J,11+NPLANE(L,1)))
      JTTH=(DISTH/290.0)+0.5
      NTHR=NCTS-NPLANE(L,10)+JTTH
      IF(NTHR.GT.10) GO TO 385
      NPLANE(L,8)=NPLANE(L,1)
      NPLANE(L,4)=NCTS+JTTH
      NPLANE(L,2)=7
      GO TO 391
  385 CONTINUE
      DIST=FLOAT(NCASE(J,11+NPLANE(L,8)))
      JTTR=(DIST/290.0)+0.5
      NPLANE(L,4)=NCTS+JTTR
      NPLANE(L,2)=7
      GO TO 391
  390 DISTH=FLOAT(NCASE(J,11+NPLANE(L,1)))
      JTTH=(DISTH/290.0)+0.5
      NTHR=NCTS-NPLANE(L,10)+JTTH
      IF(NTHR.GT.10) GO TO 386
      NPLANE(L,8)=NPLANE(L,1)
      NPLANE(L,4)=NCTS+JTTH
      NPLANE(L,2)=7
      GO TO 391
  386 CONTINUE
      DIST=FLOAT(NCASE(J,11+NPLANE(L,9)))/2.0
      JTTR=(DIST/290.0)+0.5
      NPLANE(L,4)=NCTS+JTTR
      NPLANE(L,2)=7
      NPLANE(L,8)=NPLANE(L,9)
  391 CONTINUE
C
C         DETERMINE IF ANY HELICOPTERS WERE ON THE CASE BE-
C         ING TERMINATED.  IF SO, ALTER THE SUBJECT HELICOP-
C         TER ACTION VECTOR TO INDICATE IT IS TO DEPART
C         SCENE AND REVISE ITS ARRIVAL TIME AT HOME STATION
C         OTHERWISE, CONTINUE
C
      DO 407 MM=1,20
      IF(NHACT(MM,1).EQ.0) GO TO 409
      IF(NHACT(MM,4).EQ.NCASE(J,16)) GO TO 401
      GO TO 407
  401 NHACT(MM,3)=NHACT(MM,3)-(NHACT(MM,6)-NCTS+1)
      NHACT(MM,6)=NCTS+1
  407 CONTINUE
C
C         TALLY THE NUMBER OF ON-SCENE HOURS REQUIRED THAT
C         WERE NOT COVERED FOR THE CASE BEING TERMINATED
C
  409 NOSHNC=NOSHNC+NCASE(J,8)
C
C         REMOVE THE CASE ACTION VECTOR OF THE CASE BEING
C         TERMINATED
C
      DO 400 L=J,50
      IF(NCASE(L+1,1).EQ.0) GO TO 402
      DO 396 M=1,17
      NCASE(L,M)=NCASE(L+1,M)
  396 CONTINUE
```

```
  400 CONTINUE
  402 DO 403 M=1,17
      NCASE(L,M)=0
  403 CONTINUE
      GO TO 384
C
C            HAVE A CASE WHICH INDICATES THAT IT REQUIRES A
C            C-130 TO BE LAUNCHED THIS TIME STEP.  BE SURE IT
C            DOESN'T HAVE ALL THE AIRCRAFT IT NEEDS - IF IT
C            DOES, SKIP IT, IF IT DOESN'T, LOAD THE FIRST OPEN
C            CASE ACTION VECTOR WITH THE SUBJECT CASE LOCATION
C            IN THE ACCOUNTING VECTOR ARRAY, ITS PRIORITY, AND
C            THE CLOSEST C-130 STATION TO THE SCENE OF THE
C            CASE.  INCREASE THE CASE ACTION VECTOR COUNTER BY
C            ONE
C
  404 IF(NCASE(J,11).GE.NCASE(J,7)) GO TO 406
  405 NCASA(JJ,1)=J
      NCASA(JJ,2)=NCASE(J,1)
      NCASA(JJ,3)=NCASE(J,6)
      JJ=JJ+1
      GO TO 408
  406 IF(NCASE(J,2).EQ.0) GO TO 408
      IF(NCASE(J,11).GE.NCASE(J,7)+1) GO TO 408
      GO TO 405
  408 CONTINUE
  412 JJ=JJ-1
C
C            IF THERE IS MORE THAN ONE CASE REQUIRING C-130S
C            THIS TIME STEP ORDER THEIR ACTION VECTORS BY PRI-
C            ORITY FROM HIGHEST (1) TO LOWEST (3) PRIORITY.  IF
C            NOT, GO TO C-130 REQUIREMENT DETERMINATION SEGMENT
C
      IF(JJ.LE.1) GO TO 428
  414 DO 424 M=1,JJ
      IF(NCASA(M+1,2).EQ.0) GO TO 428
      IF(NCASA(M,2).GT.NCASA(M+1,2)) GO TO 416
      GO TO 424
  416 DO 420 L=1,3
      NCASA(JJ+1,L)=NCASA(M,L)
      NCASA(M,L)=NCASA(M+1,L)
      NCASA(M+1,L)=NCASA(JJ+1,L)
      NCASA(JJ+1,L)=0
  420 CONTINUE
      GO TO 414
  424 CONTINUE
  428 CONTINUE
C
C
C**********************************************************************
C****        C-130 REQUIREMENT DETERMINATION SEGMENT              ****
C**********************************************************************
C
C            THE FUNCTION OF THE C-130 REQUIREMENT DETERMI-
C            NATION SEGMENT IS TO DETERMINE THE TOTAL NUMBER
C            OF C-130S REQUIRED IN EACH C-130 STATION AREA FOR
C            BOTH CASES AND MISSIONS AND TO DETERMINE THE SUM
C            TOTAL C-130S REQUIRED FOR THE CURRENT TIME STEP
C
C
C            ZERO THE THREE AREA MISSION C-130 REQUIREMENT
C            VECTORS
C
      NPRM(1)=0
      NPRM(2)=0
      NPRM(3)=0
C
C            DETERMINE WHETHER THERE ARE ANY C-130S REQUIRED
C            FOR MISSIONS THIS TIME STEP - IF SO, TALLY THE
C            REQUIREMENTS BY C-130 STATION AREAS (REQUIREMENT
C            FOR EACH MISSION WITH AN ACTION VECTOR IS THE TO-
C            TAL NUMBER OF C-130S REQUIRED FOR THE MISSION
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```
C          LESS THE NUMBER OF C-130S ALREADY ASSIGNED)
C
      DO 458 I=1,20
      IF(NMISA(I,3).EQ.0) GO TO 462
      IF(NMISA(I,3).EQ.1) GO TO 454
      IF(NMISA(I,3).EQ.2) GO TO 450
      NPRM(3)=NPRM(3)+NMISSN(NMISA(I,1),7)-NMISSN(NMISA(I,1)
     1,11)
      GO TO 458
  450 NPRM(2)=NPRM(2)+NMISSN(NMISA(I,1),7)-NMISSN(NMISA(I,1)
     1,11)
      GO TO 458
  454 NPRM(1)=NPRM(1)+NMISSN(NMISA(I,1),7)-NMISSN(NMISA(I,1)
     1,11)
C
C          FIND THE TOTAL C-130S REQUIRED BY MISSIONS FOR
C          THIS TIME STEP
C
  458 CONTINUE
  462 NPRMT=NPRM(1)+NPRM(2)+NPRM(3)
C
C          ZERO THE THREE AREA CASE C-130 REQUIREMENT VECTORS
C
      NPRS(1)=0
      NPRS(2)=0
      NPRS(3)=0
C
C          DETERMINE WHETHER THERE ARE ANY C-130S REQUIRED
C          FOR CASES THIS TIME STEP - IF SO, TALLY THE RE-
C          QUIREMENTS BY C-130 STATION AREAS (REQUIREMENT FOR
C          EACH NON CONTINUOUS ON-SCENE RELIEF CASE WITH AN
C          ACTION VECTOR IS THE TOTAL NUMBER OF C-130S RE-
C          QUIRED FOR THE CASE LESS THE NUMBER OF C-130S AL-
C          READY ASSIGNED TO THE CASE; FOR CONTINUOUS ON-
C          SCENE RELIEF CASES, IT IS ONE)
C
      DO 474 I=1,10
      IF(NCASA(I,3).EQ.0) GO TO 478
      IF(NCASA(I,3).EQ.1) GO TO 470
      IF(NCASA(I,3).EQ.2) GO TO 466
      IF(NCASE(NCASA(I,1),2).EQ.1) GO TO 464
      NPRS(3)=NPRS(3)+NCASE(NCASA(I,1),7)-NCASE(NCASA(I,1),
     111)
      GO TO 474
  464 NPRS(3)=NPRS(3)+1
      GO TO 474
  466 IF(NCASE(NCASA(I,1),2).EQ.1) GO TO 468
      NPRS(2)=NPRS(2)+NCASE(NCASA(I,1),7)-NCASE(NCASA(I,1),
     111)
      GO TO 474
  468 NPRS(2)=NPRS(2)+1
      GO TO 474
  470 IF(NCASE(NCASA(I,1),2).EQ.1) GO TO 472
      NPRS(1)=NPRS(1)+NCASE(NCASA(I,1),7)-NCASE(NCASA(I,1),
     111)
      GO TO 474
  472 NPRS(1)=NPRS(1)+1
  474 CONTINUE
C
C          FIND THE TOTAL C-130S REQUIRED BY CASES FOR THIS
C          TIME STEP AND TALLY THE TOTAL C-130S REQUIRED FOR
C          ALL CASES AND MISSIONS THIS TIME STEP
C
  478 NPRST=NPRS(1)+NPRS(2)+NPRS(3)
      NTPR=NPRST+NPRMT
C
C          IF THERE ARE NOT ANY C-130S REQUIRED BY EITHER
C          CASES OR MISSIONS THIS TIME STEP GO TO SEE IF ANY
C          C-130S NEED TO BE SHIFTED BACK TO THEIR HOME STA-
C          TIONS.  IF THERE ARE ANY C-130S REQUIRED THIS TIME
C          STEP, TALLY THE TOTAL C-130S REQUIRED IN EACH
C          C-130 STATION AREA
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C
      IF(NTPR.EQ.0) GO TO 2300
      NPRT(1)=NPRS(1)+NPRM(1)
      NPRT(2)=NPRS(2)+NPRM(2)
      NPRT(3)=NPRS(3)+NPRM(3)
C
C
C***********************************************************************
C****       C-130 AVAILABILITY DETERMINATION SEGMENT                ****
C***********************************************************************
C
C           THE FUNCTION OF THE C-130 AVAILABILITY DETERMI-
C           NATION SEGMENT IS TO FIND THE NUMBER OF C-130S AT
C           EACH STATION THAT WILL BE ABLE TO TAKE OFF AND
C           ANSWER A CALL DURING CURRENT TIME STEP.  IF C-130S
C           ARE ALREADY FLYING OR ARE DOWN FOR MAINTENANCE,
C           THEY ARE DISREGARDED.  EACH STATION IS CHECKED TO
C           SEE IF IT IS BELOW WEATHER MINIMUMS (SOCKED IN),
C           IF SO, NO PLANES ARE ALLOWED TO TAKE OFF DURING
C           THE CURRENT TIME STEP.  NEXT, FOR EACH C-130 THAT
C           APPEARS ABLE TO FLY AT A STATION THAT IS NOT BELOW
C           WEATHER MINIMUMS, IT IS DETERMINED WHETHER, IF THE
C           PLANE IS STARTED UP TO TAKE OFF, IT WILL BE FOUND
C           TO HAVE A MECHANICAL DISCREPANCY WHICH PRECLUDES
C           ITS DEPARTURE.  ONLY THE C-130S PASSING ALL THE
C           TESTS ARE CONSIDERED AVAILABLE FOR FLIGHT
C
C
C           CHECK FOR C-130 STATIONS BEING BELOW WEATHER MINI-
C           MUMS BEGINNING WITH THE NORTHERN C-130 STATION
C
  900 IE=IE*K
      RX=0.5+FLOAT(IE)*Z
      IF(RX.GT.TMONTH(MONTH,12)) GO TO 930
C
C           NORTHERN C-130 STATION IS BELOW WEATHER MINIMUMS.
C           CHANGE THE STATUS OF ANY C-130S AT THE SUBJECT
C           STATION WHOSE STATUS IS PRESENTLY "READY TO FLY"
C           TO REFLECT "DOWN DUE TO WEATHER"
C
      DO 920 I=1,NPIS
      IF(NPLANE(I,9).EQ.1) GO TO 910
      GO TO 920
  910 IF(NPLANE(I,2).EQ.0) NPLANE(I,2)=9
  920 CONTINUE
  930 IE=IE*K
      RX=0.5+FLOAT(IE)*Z
      IF(RX.GT.TMONTH(MONTH,13)) GO TO 960
C
C           CENTRAL C-130 STATION IS BELOW WEATHER MINIMUMS.
C           CHANGE THE STATUS OF ANY C-130S AT THE SUBJECT
C           STATION WHOSE STATUS IS PRESENTLY "READY TO FLY"
C           TO REFLECT "DOWN DUE TO WEATHER"
C
      DO 950 I=1,NPIS
      IF(NPLANE(I,9).EQ.2) GO TO 940
      GO TO 950
  940 IF(NPLANE(I,2).EQ.0) NPLANE(I,2)=9
  950 CONTINUE
  960 IE=IE*K
      RX=0.5+FLOAT(IE)*Z
      IF(RX.GT.TMONTH(MONTH,14)) GO TO 990
C
C           SOUTHERN C-130 STATION IS BELOW WEATHER MINIMUMS.
C           CHANGE THE STATUS OF ANY C-130S AT THE SUBJECT
C           STATION WHOSE STATUS IS PRESENTLY "READY TO FLY"
C           TO REFLECT "DOWN DUE TO WEATHER"
C
      DO 980 I=1,NPIS
      IF(NPLANE(I,9).EQ.3) GO TO 970
      GO TO 980
  970 IF(NPLANE(I,2).EQ.0) NPLANE(I,2)=9
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  980 CONTINUE
  990 CONTINUE
C
C           ZERO ALL C-130 STATION C-130 AVAILABILITY VECTORS
C
      NPA(1)=0
      NPA(2)=0
      NPA(3)=0
C
C           FIND ALL C-130S WHOSE STATUS INDICATES "READY TO
C           FLY"
C
      DO 1010 I=1,NPIS
      IF(NPLANE(I,2).EQ.0) GO TO 1000
      GO TO 1010
C
C           FOR EACH C-130 WHOSE STATUS INDICATES "READY TO
C           FLY" SEE IF IT WILL HAVE A MECHANICAL DISCREPANCY
C           THAT WILL MAKE IT UNABLE TO FLY ON START UP.  IF
C           IT DOES, CHANGE ITS STATUS TO REFLECT THAT IT WILL
C           BE PUT DOWN FOR MAINTENANCE IF CALLED - IF NOT,
C           TALLY IT AS AVAILABLE AT THE C-130 STATION WHERE
C           IT IS LOCATED
C
 1000 IE=IE*K
      RX=0.5+FLOAT(IE)*Z
      IF(RX.GT.PPDS) GO TO 1005
      NPLANE(I,2)=3
      GO TO 1010
 1005 NPA(NPLANE(I,9))=NPA(NPLANE(I,9))+1
 1010 CONTINUE
C
C           TALLY TOTAL NUMBER OF C-130S AVAILABLE THIS TIME
C           STEP
C
      NTPA=NPA(1)+NPA(2)+NPA(3)
C
C
C*****************************************************************
C****         C-130 ASSIGNMENT DETERMINATION SEGMENT          ****
C*****************************************************************
C
C           THE FUNCTION OF THE C-130 ASSIGNMENT DETERMINATION
C           SEGMENT IS TO ASSIGN THE AVAILABLE C-130S TO THE
C           MISSIONS AND CASES WHICH REQUIRE THEM IN THE CUR-
C           RENT TIME STEP.  THE ASSIGNMENT PROCESS IS CARRIED
C           OUT AS FOLLOWS:  IF THE NUMBER OF C-130S AVAILABLE
C           IN EACH C-130 AREA ARE SUFFICIENT TO MEET RE-
C           QUIREMENTS WITHIN EACH AREA THEN THEY ARE ASSIGNED
C           WITHIN THEIR OWN AREAS.  IF MORE C-130S ARE RE-
C           QUIRED WITHIN AN AREA THAN ARE AVAILABLE IN THE
C           AREA AN ATTEMPT IS MADE TO SUBSTITUTE HELICOPTERS
C           FOR C-130S.  IF, AFTER ATTEMPTING TO SUBSTITUTE
C           HELICOPTERS THERE ARE STILL NOT ENOUGH C-130S IN
C           EACH AREA TO COVER INDIVIDUAL AREA REQUIREMENTS,
C           BUT THERE ARE ENOUGH C-130S TO COVER ALL REQUIRE-
C           MENTS, ASSIGNMENTS ARE MADE BETWEEN AREAS AFTER
C           MAKING AS MANY ASSIGNMENTS WITHIN AREAS AS POSSIB-
C           LE.  IF THERE ARE NOT ENOUGH C-130S TO COVER ALL
C           REQUIREMENTS AFTER ATTEMPTING HELICOPTER SUBSTI-
C           TUTIONS, THEN THE AVAILABLE C-130S ARE ASSIGNED BY
C           CASE AND MISSION PRIORITY AND LEVEL OF ASSIGNMENT
C           PREFERENCES.  IN NO INSTANCE ARE C-130S SENT FROM
C           ONE C-130 AREA TO ANOTHER FOR PRIORITY THREE CASES
C           OR MISSIONS.
C
C
C           CHECK EACH C-130 STATION AREA TO SEE IF THE NUMBER
C           OF C-130S REQUIRED IN THE AREA ARE GREATER THAN
C           THE NUMBER AVAILABLE - IF THERE ARE SUCH AREAS
C           TAKE THE FIRST ONE, FROM NORTH TO SOUTH, AND GO TO
C           FILL AS MANY REQUIREMENTS IN THE AREA AS POSSIBLE
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C           WITH HELICOPTERS IF THIS IS POSSIBLE.  IF ALL
C           AREAS HAVE SUFFICIENT C-130S TO MEET THEIR RE-
C           QUIREMENTS GO TO FILL REQUIREMENTS WITH C-130S
C           WITHIN AREAS
C
      IF(NPA(1).LT.NPRT(1)) GO TO 1011
      IF(NPA(2).LT.NPRT(2)) GO TO 1012
      IF(NPA(3).LT.NPRT(3)) GO TO 1013
      GO TO 1070
 1011 KA=1
      GO TO 1015
 1012 KA=2
      GO TO 1015
 1013 KA=3
C
C           HAVE AN AREA WITH INSUFFICIENT C-130S TO COVER
C           AREA REQUIREMENTS.  SEE IF THERE IS A CASE IN THE
C           AREA REQUIRING A C-130 THIS TIME STEP WHICH IS OF
C           THE TYPE THAT A HELICOPTER COULD BE SUBSTITUTED ON
C           IF SO, INITIALIZE CALLING PARAMETERS AND CALL SUB-
C           ROUTINE SUB TO MAKE ALL POSSIBLE HELICOPTER SUB-
C           STITUTIONS ON BOTH CASES AND MISSIONS IN THE SUB-
C           JECT AREA UNTIL NO FURTHER SUBSTITUTIONS POSSIBLE
C           OR C-130S IN AREA ARE SUFFICIENT TO COVER REQUIRE-
C           MENTS, WHICHEVER OCCURS FIRST
C
 1015 DO 1025 I=1,10
      IF(NCASA(I,3).EQ.0) GO TO 1035
      IF(NCASA(I,3).EQ.KA) GO TO 1020
      GO TO 1025
 1020 IF(NCASE(NCASA(I,1),5).EQ.1) GO TO 1030
 1025 CONTINUE
      GO TO 1035
 1030 NAREA=KA
      NTYPE=1
      CALL SUB
C
C           IF THERE ARE NO MORE REQUIREMENTS FOR C-130S GO TO
C           SEE IF ANY HAVE TO BE SENT TO THEIR HOME STATIONS
C           OTHERWISE, CHECK TO SEE IF ANYMORE AREAS HAVE IN-
C           SUFFICIENT C-130S TO COVER THEIR REQUIREMENTS, IF
C           SO, GO TO SEE IF THERE ARE ANY SUBSTITUTABLE CASES
C           IN THE SUBJECT AREA.  IF NOT, GO TO DETERMINE
C           STATUS OF ALL AREAS AND MAKE DECISION ON NEXT STEP
C           TO BE TAKEN
C
      IF(NTPR.EQ.0) GO TO 2300
      IF(KA.EQ.3) GO TO 1065
      KA=KA+1
      IF(NPA(KA).LT.NPRT(KA)) GO TO 1015
      KA=KA+1
      IF(KA.EQ.4) GO TO 1065
      IF(NPA(KA).LT.NPRT(KA)) GO TO 1015
      GO TO 1065
C
C           THERE WERE NO SUBSTITUTABLE CASES IN THE AREA WITH
C           INSUFFICIENT C-130S TO FILL REQUIREMENTS SO SEE IF
C           THERE ARE ANY MISSIONS IN THE SUBJECT AREA WHICH
C           ARE OF THE TYPE THAT A HELICOPTER COULD BE SUBSTI-
C           TUTED ON.  IF SO, INITIALIZE CALLING PARAMETERS
C           AND CALL SUBROUTINE SUB TO MAKE ALL POSSIBLE HELI-
C           COPTER SUBSTITUTIONS ON MISSIONS IN THE SUBJECT
C           AREA UNTIL NO FURTHER SUBSTITUTIONS POSSIBLE OR
C           C-130S IN AREA ARE SUFFICIENT TO COVER REQUIRE-
C           MENTS, WHICHEVER OCCURS FIRST
C
 1035 KB=KA
 1040 DO 1050 I=1,20
      IF(NMISA(I,3).EQ.0) GO TO 1060
      IF(NMISA(I,3).EQ.KB) GO TO 1045
      GO TO 1050
 1045 IF(NMISSN(NMISA(I,1),5).EQ.1) GO TO 1055
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 1050 CONTINUE
      GO TO 1060
 1055 NAREA=KB
      NTYPE=2
      CALL SUB
C
C          IF THERE ARE NO MORE REQUIREMENTS FOR C-130S GO TO
C          SEE IF ANY HAVE TO BE SENT TO THEIR HOME STATIONS
C          OTHERWISE, CHECK TO SEE IF ANYMORE AREAS HAVE IN-
C          SUFFICIENT C-130S TO COVER THEIR REQUIREMENTS, IF
C          SO, GO TO SEE IF THERE ARE ANY SUBSTITUTABLE CASES
C          IN THE SUBJECT AREA.  IF NOT, GO TO DETERMINE
C          STATUS OF ALL AREAS AND MAKE DECISION ON NEXT STEP
C          TO BE TAKEN
C
 1060 IF(NTPR.EQ.0) GO TO 2300
      IF(KB.EQ.3) GO TO 1065
      KA=KB+1
      IF(NPA(KA).LT.NPRT(KA)) GO TO 1015
      KA=KA+1
      IF(KA.EQ.4) GO TO 1065
      IF(NPA(KA).LT.NPRT(KA)) GO TO 1015
C
C          ALL POSSIBLE HELICOPTER SUBSTITUTIONS HAVE BEEN
C          MADE IN APPLICABLE AREAS.  IF THERE IS ANY AREA
C          WHICH STILL DOES NOT HAVE ENOUGH C-130S AVAILABLE
C          TO COVER ITS REQUIREMENTS THIS TIME STEP, GO TO
C          MAKE C-130 ASSIGNMENTS BETWEEN AREAS.  IF SUFFIC-
C          IENT C-130S ARE AVAILABLE IN EACH AREA TO FILL THE
C          INDIVIDUAL AREA REQUIREMENTS, ASSIGN C-130S TO
C          CASES WITHIN OWN AREAS
C
 1065 IF(NPA(1).LT.NPRT(1)) GO TO 1160
      IF(NPA(2).LT.NPRT(2)) GO TO 1160
      IF(NPA(3).LT.NPRT(3)) GO TO 1160
C
C          THERE ARE SUFFICIENT C-130S IN EACH AREA TO COVER
C          EACH AREA'S REQUIREMENTS SO FILL ALL REQUIREMENTS
C          WITH AIRCRAFT WITHIN THE AREAS
C
 1070 L=1
      GO TO 1085
 1075 L=2
      GO TO 1085
 1080 L=3
C
C          IF THERE ARE NOT ANY C-130 REQUIREMENTS IN SUBJECT
C          AREA, GO TO CHECK NEXT AREA
C
 1085 IF(NPRT(L).GT.0) GO TO 1100
      IF(L.EQ.1) GO TO 1075
      IF(L.EQ.2) GO TO 1080
C
C          ALL C-130 REQUIREMENTS FOR CURRENT TIME STEP HAVE
C          BEEN FILLED SO GO TO SEE IF ANY C-130S HAVE TO BE
C          SENT TO THEIR HOME STATIONS
C
      GO TO 2300
C
C          C-130 FROM SUBJECT AREA REQUIRED FOR A MISSION OR
C          CASE IN THAT AREA SO INITIALIZE PARAMETERS ACCORD-
C          INGLY AND CALL SUBROUTINE PLANE TO FIND SPECIFIC
C          C-130 TO BE USED
C
 1100 NAREA=L
      NAREAS=L
      CALL PLANE
C
C          SEE IF IT IS A CASE IN THE SUBJECT AREA THAT RE-
C          QUIRES THE C-130 - IF SO, FIND THE CASE, INITIAL-
C          IZE THE CALLING PARAMETERS ACCORDINGLY AND CALL
C          SUBROUTINE FILL.  IF IT IS NOT A CASE, GO TO FIND
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C           THE MISSION THAT REQUIRES THE C-130
C
 1125 DO 1130 I=1,10
      IF(NCASA(I,3).EQ.0) GO TO 1140
      IF(NCASA(I,3).EQ.L) GO TO 1135
 1130 CONTINUE
      GO TO 1140
 1135 NACE=NCASA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C           JUST FILLED A C-130 REQUIREMENT FOR A CASE IN SUB-
C           JECT AREA.  IF MORE C-130S ARE REQUIRED IN THE
C           SAME AREA GO BACK TO FILL THE REMAINING REQUIRE-
C           MENTS.  IF NO FURTHER C-130S ARE REQUIRED AT ALL,
C           GO TO SEE IF A C-130 HAS TO BE SENT BACK TO ITS
C           HOME STATION.  IF THERE ARE STILL MORE C-130S RE-
C           QUIRED IN OTHER AREAS, GO TO CHANGE THE AREA DES-
C           IGNATION AND FILL THE REQUIREMENTS
C
      IF(NPRT(L).GT.0) GO TO 1100
      IF(NTPR.EQ.0) GO TO 2300
      IF(L.EQ.1) GO TO 1075
      IF(L.EQ.2) GO TO 1080
C
C           THE C-130 REQUIREMENT IN THE SUBJECT AREA IS FOR
C           A MISSION - FIND THE MISSION, INITIALIZE THE CALL-
C           ING PARAMETERS ACCORDINGLY AND CALL SUBROUTINE
C           FILL
C
 1140 DO 1145 I=1,20
      IF(NMISA(I,3).EQ.L) GO TO 1150
 1145 CONTINUE
 1150 NISSN=NMISA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C           JUST FILLED A C-130 REQUIREMENT FOR A MISSION IN
C           SUBJECT AREA.  IF MORE C-130S ARE REQUIRED IN THE
C           SAME AREA GO BACK TO FILL THE REMAINING REQUIRE-
C           MENTS.  IF NO FURTHER C-130S ARE REQUIRED AT ALL,
C           GO TO SEE IF A C-130 HAS TO BE SENT BACK TO ITS
C           HOME STATION.  IF THERE ARE STILL MORE C-130S RE-
C           QUIRED IN OTHER AREAS GO TO CHANGE THE AREA DESIG-
C           NATION AND FILL THE REQUIREMENTS
C
      IF(NPRT(L).GT.0) GO TO 1100
      IF(NTPR.EQ.0) GO TO 2300
      IF(L.EQ.1) GO TO 1075
      IF(L.EQ.2) GO TO 1080
C
C           THERE ARE NOT ENOUGH C-130S IN EACH AREA TO COVER
C           THE C-130 REQUIREMENTS WITHIN THE AREAS.  IF THERE
C           ARE AT LEAST AS MANY TOTAL C-130S AVAILABLE AS
C           THERE ARE REQUIREMENTS, MAKE ASSIGNMENTS BETWEEN
C           AREAS.  IF THERE ARE NOT AS MANY TOTAL C-130S AS
C           ARE REQUIRED, GO TO MAKE ASSIGNMENTS BY CASE AND
C           MISSION PRIORITIES
C
 1160 NTPA=NPA(1)+NPA(2)+NPA(3)
      NTPR=NPRT(1)+NPRT(2)+NPRT(3)
      IF(NTPA.LT.NTPR) GO TO 1600
C
C           THERE ARE NOT ENOUGH C-130S IN EACH AREA TO COVER
C           THE C-130 REQUIREMENTS WITHIN THE AREAS BUT THERE
C           ARE AT LEAST AS MANY TOTAL C-130S AVAILABLE AS ARE
C           REQUIRED SO ASSIGNMENTS WILL BE MADE BETWEEN AREAS
C           MAKING AS MANY ASSIGNMENTS WITHIN THE AREAS AS
C           POSSIBLE FIRST
C
 1200 L=1
C
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C           IF THERE ARE C-130S AVAILABLE AND REQUIRED IN THE
C           SUBJECT AREA GO TO FILL AS MANY REQUIREMENTS WITH-
C           IN THE AREA AS POSSIBLE, IF NOT, GO TO NEXT AREA
C
 1210 IF(NPA(L).EQ.0) GO TO 1220
      IF(NPRT(L).GT.0) GO TO 1230
C
C           THERE WERE EITHER NOT ANY C-130S REQUIRED IN THE
C           SUBJECT AREA OR NO C-130S AVAILABLE.  IF ALL AREAS
C           HAVE BEEN CHECKED AND WITHIN AREA ASSIGNMENTS MADE
C           GO TO ASSIGN C-130S BETWEEN AREAS - OTHERWISE EX-
C           AMINE NEXT AREA
C
 1220 IF(L.EQ.3) GO TO 1300
      L=L+1
      GO TO 1210
C
C           DETERMINE IF THERE IS A CASE IN THE SUBJECT AREA
C           REQUIRING ONE OF THE AREA'S AVAILABLE C-130S - IF
C           SO, INITIALIZE THE CALLING PARAMETERS ACCORDINGLY,
C           CALL SUBROUTINES PLANE AND FILL TO SATISFY THE RE-
C           QUIREMENT - IF NO CASE REQUIREMENT, GO TO SATISFY
C           MISSION REQUIREMENT
C
 1230 DO 1240 I=1,10
      IF(NCASA(I,3).EQ.0) GO TO 1260
      IF(NCASA(I,3).EQ.L) GO TO 1250
 1240 CONTINUE
 1250 NACE=NCASA(I,1)
      NAREA=L
      NAREAS=L
      CALL PLANE
      NPANE=NPLUSE
      CALL FILL
C
C           CASE C-130 REQUIREMENT IN SUBJECT AREA HAS BEEN
C           SATISFIED, IF NO FURTHER REQUIREMENTS OR NO FUR-
C           THER C-130S IN SUBJECT AREA, GO TO NEXT AREA -
C           OTHERWISE GO TO FILL NEXT REQUIREMENT IN PRESENT
C           AREA
C
      IF(NPRT(L).EQ.0) GO TO 1290
      IF(NPA(L).EQ.0) GO TO 1290
      GO TO 1230
C
C           THE AREA REQUIREMENT FOR ONE OF THE SUBJECT AREA'S
C           AVAILABLE C-130S IS FOR A MISSION.  DETERMINE THE
C           MISSION, INITIALIZE THE CALLING PARAMETERS FOR
C           SUBROUTINES PLANE AND FILL ACCORDINGLY AND SATISFY
C           THE REQUIREMENT
C
 1260 DO 1270 I=1,20
      IF(NMISA(I,3).EQ.0) GO TO 1290
      IF(NMISA(I,3).EQ.L) GO TO 1280
 1270 CONTINUE
 1280 NISSN=NMISA(I,1)
      NAREA=L
      NAREAS=L
      CALL PLANE
      NPANE=NPLUSE
      CALL FILL
C
C           MISSION C-130 REQUIREMENT IN SUBJECT AREA HAS BEEN
C           SATISFIED, IF NO FURTHER REQUIREMENT OR NO FURTHER
C           C-130S IN SUBJECT AREA, GO TO NEXT AREA - OTHER-
C           WISE GO TO FILL NEXT MISSION REQUIREMENT IN PRES-
C           ENT AREA
C
      IF(NPRT(L).EQ.0) GO TO 1290
      IF(NPA(L).EQ.0) GO TO 1290
      GO TO 1260
 1290 IF(L.EQ.3) GO TO 1300
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      L=L+1
      GO TO 1210
C
C           ALL POSSIBLE WITHIN AREA C-130 ASSIGNMENTS HAVE
C           BEEN MADE.  FURTHER ASSIGNMENTS MUST BE MADE BE-
C           TWEEN AREAS.  C-130S ARE NOT TO BE SENT FROM ONE
C           AREA TO SATISFY PRIORITY THREE REQUIREMENTS IN
C           ANOTHER AREA SO, FOR ACCOUNTING PURPOSES, REDUCE
C           THE NUMBER OF TOTAL C-130S REQUIRED IN EACH AREA
C           AND TOTAL OVERALL BY THE NUMBER OF PRIORITY THREE
C           CASE AND MISSION C-130 REQUIREMENTS FOR CURRENT
C           TIME STEP WHICH HAVE NOT BEEN SATISFIED
C
 1300 DO 1302 I=1,10
      IF(NCASA(I,2).EQ.0) GO TO 1303
      IF(NCASA(I,2).EQ.3) GO TO 1301
      GO TO 1302
 1301 NPRT(NCASA(I,3))=NPRT(NCASA(I,3))-NCASE(NCASA(I,1),7)+
     1NCASE(NCASA(I,1),11)
 1302 CONTINUE
 1303 DO 1305 I=1,20
      IF(NMISA(I,2).EQ.0) GO TO 1306
      IF(NMISA(I,2).EQ.3) GO TO 1304
      GO TO 1305
 1304 NPRT(NMISA(I,3))=NPRT(NMISA(I,3))-NMISSN(NMISA(I,1),7)
     1+NMISSN(NMISA(I,1),11)
 1305 CONTINUE
 1306 NTPR=NPRT(1)+NPRT(2)+NPRT(3)
C
C           NOW THAT PRIORITY THREE C-130 REQUIREMENTS HAVE
C           BEEN NEGATED SEE IF ANY FURTHER REQUIREMENTS EXIST
C           IF NOT, GO TO UNANSWERED REQUIREMENTS ADJUSTMENT
C           SEGMENT - OTHERWISE, CONTINUE
C
      IF(NTPR.EQ.0) GO TO 2000
C
C           SEE IF A C-130 REQUIREMENT EXISTS IN THE CENTRAL
C           C-130 AREA.  IF NOT, GO TO CHECK THE NORTHERN AREA
C
      IF(NPRT(2).EQ.0) GO TO 1410
C
C           A C-130 REQUIREMENT EXISTS IN THE CENTRAL C-130
C           AREA AND THERE IS NOT A C-130 AVAILABLE THERE. DE-
C           TERMINE WHETHER THE REQUIREMENT IS FOR A CASE OR A
C           MISSION, IDENTIFY THE SUBJECT CASE OR MISSION,
C           AND DETERMINE WHETHER IT IS CLOSER TO THE NORTHERN
C           OR SOUTHERN C-130 AREA.  IF A PLANE IS AVAILABLE
C           IN THE CLOSEST AREA, TAKE IT - OTHERWISE TAKE THE
C           PLANE FROM THE OTHER AREA.  INITIALIZE THE CALLING
C           PARAMETERS FOR SUBROUTINES PLANE AND FILL ACCORD-
C           INGLY AND SATISFY THE REQUIREMENT
C
 1310 DO 1320 I=1,10
      IF(NCASA(I,3).EQ.0) GO TO 1360
      IF(NCASA(I,2).EQ.3) GO TO 1360
      IF(NCASA(I,3).EQ.2) GO TO 1330
 1320 CONTINUE
 1330 IF(NCASE(NCASA(I,1),12).LT.NCASE(NCASA(I,1),14)) GO TO
     11340
      IF(NPA(3).EQ.0) GO TO 1340
 1335 NAREA=3
      GO TO 1350
 1340 IF(NPA(1).EQ.0) GO TO 1335
      NAREA=1
 1350 NAREAS=2
      CALL PLANE
      NPANE=NPLUSE
      NACE=NCASA(I,1)
      CALL FILL
C
C           CASE REQUIREMENT FOR A C-130 IN THE CENTRAL C-130
C           AREA HAS BEEN SATISFIED.  IF NO FURTHER C-130S ARE
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C          REQUIRED, GO TO THE UNANSWERED REQUIREMENTS AD-
C          JUSTMENT SEGMENT - IF MORE C-130S ARE REQUIRED IN
C          CENTRAL C-130 AREA GO TO FILL THEM - OTHERWISE, GO
C          TO CHECK NORTHERN AREA
C
      IF(NTPR.EQ.0) GO TO 2000
      IF(NPRT(2).EQ.0) GO TO 1410
      GO TO 1360
 1360 DO 1370 I=1,20
      IF(NMISA(I,2).EQ.3) GO TO 1405
      IF(NMISA(I,3).EQ.2) GO TO 1380
 1370 CONTINUE
 1380 IF(NMISSN(NMISA(I,1),12).LT.NMISSN(NMISA(I,1),14)) GO
     1TO 1395
      IF(NPA(3).EQ.0) GO TO 1395
 1390 NAREA=3
      GO TO 1400
 1395 IF(NPA(1).EQ.0) GO TO 1390
      NAREA=1
 1400 NAREAS=2
      CALL PLANE
      NPANE=NPLUSE
      NISSN=NMISA(I,1)
      CALL FILL
 1405 CONTINUE
C
C          MISSION REQUIREMENT FOR A C-130 IN THE CENTRAL
C          C-130 AREA HAS BEEN SATISFIED.  IF NO FURTHER
C          C-130S ARE REQUIRED, GO TO THE UNANSWERED REQUIRE-
C          MENTS ADJUSTMENT SEGMENT - IF MORE C-130S ARE RE-
C          QUIRED IN CENTRAL C-130 AREA GO TO FILL THEM -
C          OTHERWISE GO TO CHECK NORTHERN AREA
C
      IF(NTPR.EQ.0) GO TO 2000
      IF(NPRT(2).EQ.0) GO TO 1410
      GO TO 1360
C
C          HAVE REQUIREMENTS FOR C-130S IN EITHER THE NORTH-
C          ERN OR SOUTHERN C-130 AREA OR BOTH.  BEGIN CHECK-
C          ING FOR THE NORTHERN AREA AND THEN THE SOUTHERN.
C
 1410 L=1
      LL=3
C
C          IF NO C-130S REQUIRED IN SUBJECT AREA (NORTHERN)
C          GO TO CHECK OTHER AREA (SOUTHERN)
C
 1420 IF(NPRT(L).EQ.0) GO TO 1520
C
C          A C-130 REQUIREMENT EXISTS IN THE SUBJECT C-130
C          AREA AND THERE IS NOT A C-130 AVAILABLE THERE. DE-
C          TERMINE WHETHER THE REQUIREMENT IS FOR A CASE OR A
C          MISSION, IDENTIFY THE SUBJECT CASE OR MISSION AND
C          DETERMINE IF A C-130 IS AVAILABLE IN THE CENTRAL
C          C-130 AREA; IF IT IS, TAKE IT, OTHERWISE TAKE
C          C-130 FROM THE OTHER AREA (FURTHEST AWAY) - IN-
C          ITIALIZE THE CALLING PARAMETERS FOR SUBROUTINES
C          PLANE AND FILL ACCORDINGLY AND SATISFY THE RE-
C          QUIREMENT
C
 1430 DO 1440 I=1,10
      IF(NCASA(I,3).EQ.0) GO TO 1441
      IF(NCASA(I,2).EQ.3) GO TO 1441
      IF(NCASA(I,3).EQ.L) GO TO 1445
 1440 CONTINUE
 1441 DO 1442 I=1,20
      IF(NMISA(I,2).EQ.3) GO TO 1465
      IF(NMISA(I,3).EQ.L) GO TO 1446
 1442 CONTINUE
 1445 NACE=NCASA(I,1)
      GO TO 1448
 1446 NISSN=NMISA(I,1)
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 1448 IF(NPA(2).EQ.0) GO TO 1450
      NAREA=2
      GO TO 1460
 1450 NAREA=LL
 1460 NAREAS=L
      CALL PLANE
      NACE=NCASA(I,1)
      NPANE=NPLUSF
      CALL FILL
 1465 CONTINUE
C
C           EITHER A CASE OR A MISSION C-130 REQUIREMENT HAS
C           BEEN SATISFIED IN THE SUBJECT AREA.  IF NO MORE
C           C-130S ARE REQUIRED GO TO UNANSWERED REQUIREMENTS
C           ADJUSTMENT SEGMENT.  IF MORE C-130 REQUIREMENTS
C           EXIST IN SUBJECT AREA GO TO FILL THEM.  IF THERE
C           ARE NO FURTHER C-130 REQUIREMENTS IN SUBJECT AREA
C           GO TO FILL REQUIREMENTS IN FINAL AREA (SOUTHERN)
C
      IF(NTPR.EQ.0) GO TO 2000
      IF(NPRT(L).EQ.0) GO TO 1520
      GO TO 1430
 1520 CONTINUE
      L=3
      LL=1
      GO TO 1420
 1600 CONTINUE
C
C           THERE ARE NOT ENOUGH C-130S AVAILABLE TO SATISFY
C           ALL THE REQUIREMENTS FOR THE CURRENT TIME STEP SO
C           ASSIGNMENTS OF THE AVAILABLE C-130S WILL HAVE TO
C           BE BY CASE AND MISSION PRIORITIES. CALL SUBROUTINE
C           ASSIGN TO TRY AND INSURE THAT EVERY PRIORITY ONE
C           CASE HAS AT LEAST ONE AIRCRAFT ASSIGNED
C
      JPRI=1
      JCEC=1
      CALL ASSIGN
C
C           IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C           SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C           AND INSURE THAT EVERY PRIORITY ONE MISSION HAS AT
C           LEAST ONE AIRCRAFT ASSIGNED
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=1
      JCEC=4
      CALL ASSIGN
C
C           IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C           SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C           AND BRING EVERY PRIORITY ONE CASE UP TO AT LEAST
C           50 PERCENT OF THE C-130S IT REQUIRES
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=1
      JCEC=2
      CALL ASSIGN
C
C           IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C           SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C           AND INSURE THAT EVERY PRIORITY TWO CASE HAS AT
C           LEAST ONE AIRCRAFT ASSIGNED
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=2
      JCEC=1
      CALL ASSIGN
C
C           IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C           SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C           AND BRING EVERY PRIORITY TWO CASE UP TO AT LEAST
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C         50 PERCENT OF THE C-130S IT REQUIRES
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=2
      JDEC=2
      CALL ASSIGN
C
C         IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C         SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C         AND INSURE THAT EVERY PRIORITY TWO MISSION HAS AT
C         LEAST ONE C-130 ASSIGNED
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=2
      JDEC=4
      CALL ASSIGN
C
C         IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C         SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C         AND INSURE THAT EVERY PRIORITY THREE CASE HAS AT
C         LEAST ONE C-130 ASSIGNED IF C-130 AVAILABLE IN
C         CASE AREA
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=3
      JDEC=-1
      CALL ASSIGN
C
C         IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C         SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C         AND INSURE THAT EVERY PRIORITY THREE MISSION HAS
C         AT LEAST ONE C-130 ASSIGNED IF C-130 AVAILABLE IN
C         MISSION AREA
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=3
      JDEC=10
      CALL ASSIGN
C
C         IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C         SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C         AND INSURE THAT EVERY PRIORITY ONE CASE IS FILLED
C         WITH THE NUMBER OF C-130S IT REQUIRES
C
      IF(NTPA.EQ.0) GO TO 2000
      JPI=1
      JDEC=0
      CALL ASSIGN
C
C         IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C         SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C         AND INSURE THAT EVERY PRIORITY ONE MISSION IS
C         FILLED WITH THE NUMBER OF C-130S IT REQUIRES
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=1
      JDEC=5
      CALL ASSIGN
C
C         IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C         SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C         AND INSURE THAT EVERY PRIORITY TWO CASE IS FILLED
C         WITH THE NUMBER OF C-130S IT REQUIRES
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=2
      JDEC=0
      CALL ASSIGN
C
C         IF THERE ARE NO MORE C-130S AVAILABLE, GO TO NEXT
C         SEGMENT , OTHERWISE CALL SUBROUTINE ASSIGN TO TRY
C         AND INSURE THAT EVERY PRIORITY TWO MISSION IS
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C           FILLED WITH THE NUMBER OF C-130S IT REQUIRES
C
      IF(NTPA.EQ.0) GO TO 2000
      JPRI=2
      JDEC=5
      CALL ASSIGN
 2000 CONTINUE
C
C
C***********************************************************************
C****       UNANSWERED REQUIREMENTS ADJUSTMENT SEGMENT             ****
C***********************************************************************
C
C           THE FUNCTION OF THE UNANSWERED REQUIREMENTS AD-
C           JUSTMENT SEGMENT IS TO EXAMINE EACH MISSION AND
C           CASE WHICH REQUIRED C-130S DURING THE CURRENT TIME
C           STEP BUT DID NOT RECEIVE THEM.  FOR CASES, NEW
C           C-130 DEPARTURE TIMES ARE DETERMINED AND ENTERED
C           INTO THE SUBJECT CASE ACCOUNTING VECTORS.  FOR
C           MISSIONS IT IS DETERMINED WHETHER THE SUBJECT MIS-
C           SION CAN BE HELD PAST ITS REGULAR TAKE OFF TIME.
C           IF IT CAN BE HELD THEN A NEW TAKE OFF TIME IS DE-
C           TERMINED FOR IT AND IS ENTERED IN ITS ACCOUNTING
C           VECTOR.  IF THE MISSION CAN NOT BE HELD AND THERE
C           ARE NOT ANY PLANES ASSIGNED TO IT, IT IS CANCELLED
C           IF IT HAS AT LEAST ONE PLANE ASSIGNED TO IT, IT IS
C           NOT CANCELLED BUT A NEW TAKE OFF TIME IS NOT DE-
C           TERMINED FOR IT
C
C
C           DETERMINE WHETHER ANY CASES REQUIRED C-130S THIS
C           TIME STEP AND DID NOT GET THEM.  IF NOT, GO TO
C           CHECK FOR MISSIONS
C
      DO 2020 I=1,10
      IF(NCASA(I,1).EQ.0) GO TO 2030
C
C           A CASE THAT REQUIRED A C-130 THIS TIME STEP DID
C           NOT RECEIVE ONE.  DETERMINE A NEW TIME OF C-130
C           TAKE OFF FOR THE SUBJECT CASE DEPENDING ON WHETHER
C           IT IS A CONTINUOUS ON-SCENE RELIEF TYPE OR NOT,
C           THE TIME OF DAY AND DISTANCE TO THE CASE SCENE
C
      IF(NCASE(NCASA(I,1),2).EQ.1) GO TO 2010
      TIFLY=FLOAT(NCASE(NCASA(I,1),11+NCASE(NCASA(I,1),6)))
     1/290.0
      IF(NDAYTI+TIFLY.LE.16) GO TO 2010
      NCASE(NCASA(I,1),9)=NCTS+30-NDAYTI
      GO TO 2020
 2010 NCASE(NCASA(I,1),9)=NCTS+1
 2020 CONTINUE
 2030 DO 2140 I=1,20
C
C           DETERMINE WHETHER ANY MISSIONS REQUIRED C-130S
C           THIS TIME STEP AND DID NOT GET THEM
C
 2040 IF(NMISA(I,1).EQ.0) GO TO 2150
C
C           A MISSION THAT REQUIRED A C-130 THIS TIME STEP DID
C           NOT RECEIVE ONE.  SEE WHETHER IT CAN BE HELD FOR
C           ANOTHER TAKE OFF TIME OR NOT AND ACT ACCORDINGLY
C
      IF(NMISSN(NMISA(I,1),2).GT.0) GO TO 2050
      GO TO 2140
C
C           THE MISSION CAN BE HELD FOR AT LEAST ONE HOUR.  IF
C           IT IS A PRIORITY ONE MISSION SET ITS NEXT C-130
C           TAKE OFF TIME AS THE NEXT TIME STEP.  GO TO UPDATE
C           THE SUBJECT MISSION VECTOR TO INDICATE NEW C-130
C           REQUIREMENT TIME, REDUCED HOLDING TIME AND NEW
C           TIME OF MISSION COMPLETION
C
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 2050 IF(NMISSN(NMISA(I,1),1).EQ.1) GO TO 2060
C
C          HAVE A PRIORITY TWO OR THREE MISSION THAT CAN BE
C          HELD.  DETERMINE NEW C-130 TAKE OFF TIME FOR SUB-
C          JECT MISSION BY TAKING INTO ACCOUNT THE NUMBER OF
C          HOURS IT CAN BE HELD AND TIME OF DAY.  IF POSSIBLE
C          WAIT FOR NEXT REGULAR MISSION TAKE OFF TIME.  IF
C          THIS ISN'T POSSIBLE, MAKE TAKE OFF TIME THE NEXT
C          TIME STEP.  UPDATE THE SUBJECT MISSION ACCOUNTING
C          VECTOR TO INDICATE NEW C-130 REQUIREMENT TIME, RE-
C          DUCED HOLDING TIME AND NEW TIME OF MISSION COM-
C          PLETION ACCORDINGLY
C
      IF(NMISSN(NMISA(I,1),2).LT.4) GO TO 2060
      IF(NDAYTI.GE.12) GO TO 2070
      NMISSN(NMISA(I,1),10)=NMISSN(NMISA(I,1),10)+4
      NMISSN(NMISA(I,1),9)=NMISSN(NMISA(I,1),9)+4
      NMISSN(NMISA(I,1),2)=NMISSN(NMISA(I,1),2)-4
      GO TO 2090
 2060 NMISSN(NMISA(I,1),9)=NMISSN(NMISA(I,1),9)+1
      NMISSN(NMISA(I,1),10)=NMISSN(NMISA(I,1),10)+1
      NMISSN(NMISA(I,1),2)=NMISSN(NMISA(I,1),2)-1
      GO TO 2090
 2070 NDEC=31-NDAYTI
      IF(NMISSN(NMISA(I,1),2).GE.NDEC) GO TO 2080
      GO TO 2140
 2080 NMISSN(NMISA(I,1),9)=NMISSN(NMISA(I,1),9)+NDEC
      NMISSN(NMISA(I,1),10)=NMISSN(NMISA(I,1),10)+NDEC
      NMISSN(NMISA(I,1),2)=NMISSN(NMISA(I,1),2)-NDEC
C
C          ZERO MISSION ACTION VECTOR OF MISSION THAT WAS
C          JUST HELD
C
 2090 DO 2110 J=I,20
      IF(NMISA(J+1,1).EQ.0) GO TO 2120
      DO 2100 L=1,3
      NMISA(J,L)=NMISA(J+1,L)
 2100 CONTINUE
 2110 CONTINUE
 2120 DO 2130 L=1,3
      NMISA(J,L)=0
 2130 CONTINUE
      GO TO 2040
 2140 CONTINUE
C
C          ALL MISSIONS THAT COULD BE HELD HAVE BEEN.  NOW
C          INVESTIGATE THOSE MISSIONS THAT CAN NOT BE HELD
C          AND DIDN'T RECEIVE A REQUIRED C-130 THIS TIME STEP
C
 2150 DO 2210 I=1,20
 2155 IF(NMISA(I,1).EQ.0) GO TO 2220
      IF(NMISSN(NMISA(I,1),11).GT.0) GO TO 2160
      GO TO 2210
C
C          HAVE A MISSION THAT CAN NOT BE HELD BUT HAS AT
C          LEAST ONE AIRCRAFT ALREADY ASSIGNED TO IT.  DETER-
C          MINE THE PORTION OF MISSION FLIGHT HOURS THAT WILL
C          NOT BE COVERED AND TALLY THEM.  ZERO THE MISSION'S
C          ACTION VECTOR BUT DO NOT CHANGE ITS ACCOUNTING
C          VECTOR
C
 2160 TICOMA=FLOAT(NMISSN(NMISA(I,1),8))
      TICOMB=FLOAT(NMISSN(NMISA(I,1),7)-NMISSN(NMISA(I,1),
     111))/FLOAT(NMISSN(NMISA(I,1),7))
      NMHLST=NMHLST+TICOMA-(TICOMA*TICOMB)+0.5
      DO 2180 J=I,20
      IF(NMISA(J+1,1).EQ.0) GO TO 2190
      DO 2170 L=1,3
      NMISA(J,L)=NMISA(J+1,L)
 2170 CONTINUE
 2180 CONTINUE
 2190 DO 2200 L=1,3
```

```
      NMISA(J,L)=0
 2200 CONTINUE
      GO TO 2155
 2210 CONTINUE
C
C          CHECK ALL MISSIONS WITH A C-130 REQUIREMENT TIME
C          LESS THAN OR EQUAL TO THE CURRENT TIME STEP.  IF
C          ANY OF THESE MISSIONS DO NOT HAVE ANY AIRCRAFT
C          ATTACHED TALLY THE NUMBER OF FLIGHT HOURS NOT COV-
C          ERED AND CANCEL THE SUBJECT MISSION (ZERO ITS
C          ACCOUNTING VECTOR)
C
 2220 DO 2290 I=1,100
      IF(NMISSN(I,9).EQ.0) GO TO 2300
      IF(NMISSN(I,9).LE.NCTS) GO TO 2230
      GO TO 2290
 2230 IF(NMISSN(I,11).EQ.0) GO TO 2240
      GO TO 2290
 2240 NMHLST=NMHLST+NMISSN(I,8)
      DO 2260 J=I,100
      IF(NMISSN(J+1,1).EQ.0) GO TO 2270
      DO 2250 M=1,16
      NMISSN(J,M)=NMISSN(J+1,M)
 2250 CONTINUE
 2260 CONTINUE
 2270 DO 2280 M=1,16
      NMISSN(J,M)=0
 2280 CONTINUE
 2290 CONTINUE
 2300 CONTINUE
C
C
C*****************************************************************
C****           STATION TO STATION SHIFT SEGMENT             ****
C*****************************************************************
C
C          THE FUNCTION OF THE STATION TO STATION SHIFT SEG-
C          MENT IS TO TAKE ANY C-130S THAT ARE IN A "READY TO
C          FLY" STATUS AND ARE AT A STATION OTHER THAN THEIR
C          HOME STATION BETWEEN 0800 AND 1500 AND SEND THEM
C          TO THEIR HOME STATIONS
C
C
C          IF THE TIME OF DAY IS NOT BETWEEN 0800 AND 1500 GO
C          TO RON DETERMINATION SEGMENT
C
      IF(NDAYTI.LT.8) GO TO 2430
      IF(NDAYTI.GT.15) GO TO 2430
C
C          FIND ALL PLANES IN A "READY TO FLY" STATUS AND
C          CHECK THEIR LOCATIONS.  IF THEY ARE NOT AT THEIR
C          HOME STATIONS INITIALIZE THE CALLING PARAMETERS
C          FOR SUBROUTINE FILL ACCORDINGLY AND SEND THE
C          PLANES TO THEIR HOME STATIONS
C
 2400 DO 2420 I=1,NPIS
      IF(NPLANE(I,2).GT.0) GO TO 2420
      IF(NPLANE(I,9).EQ.NPLANE(I,1)) GO TO 2420
      NRTN=1
      NPANE=I
      CALL FILL
 2420 CONTINUE
 2430 CONTINUE
C
C
C*****************************************************************
C****                 RON DETERMINATION SEGMENT              ****
C*****************************************************************
C
C          THE FUNCTION OF THE RON DETERMINATION SEGMENT IS
C          TO IDENTIFY THOSE C-130S THAT STAY OVERNIGHT AT A
C          STATION OTHER THAN THEIR HOME STATION AND TALLY
```

```
C          THE INFORMATION
C
C
C          IF THE TIME OF DAY IS NOT 0100 GO TO ZERO ALL
C          ACTION VECTORS
C
      IF(NDAYTI.NE.1) GO TO 2450
      DO 2440 I=1,NPIS
C
C          IDENTIFY ALL C-130S THAT ARE NOT FLYING AND SEE IF
C          THEY ARE AT THEIR HOME STATIONS.  IF THEY ARE NOT
C          AT THEIR HOME STATIONS TALLY AN OVERNIGHT STAY AT
C          THE STATION WHERE THEY ARE LOCATED AND AN OVER-
C          NIGHT STAY AWAY FROM THEIR HOME STATION
C
      IF(NPLANE(I,2).GT.3) GO TO 2440
      IF(NPLANE(I,2).EQ.1) GO TO 2440
      IF(NPLANE(I,1).EQ.NPLANE(I,9)) GO TO 2440
      NRONA(NPLANE(I,9))=NRONA(NPLANE(I,9))+1
      NRONF(NPLANE(I,1))=NRONF(NPLANE(I,1))+1
 2440 CONTINUE
 2450 CONTINUE
C
C          ALL ACTION THAT IS TO BE TAKEN DURING CURRENT TIME
C          STEP HAS BEEN COMPLETED.  ZERO THE MISSION AND
C          CASE ACTION VECTOR ARRAYS IN PREPARATION FOR THE
C          NEXT TIME STEP
C
      DO 3010 I=1,20
      IF(NMISA(I,1).EQ.0) GO TO 3020
      DO 3000 J=1,3
      NMISA(I,J)=0
 3000 CONTINUE
 3010 CONTINUE
 3020 CONTINUE
      DO 3040 I=1,10
      IF(NCASA(I,1).EQ.0) GO TO 3050
      DO 3030 J=1,3
      NCASA(I,J)=0
 3030 CONTINUE
 3040 CONTINUE
 3050 CONTINUE
C
C          FOR EACH C-130 THAT WAS IN A "DOWN IF CALLED"
C          STATUS THAT WAS NOT CALLED OR "DOWN DUE TO WEATH-
C          ER" STATUS, CHANGE STATUS FOR NEXT TIME STEP TO
C          INDICATE "READY TO FLY"
C
      DO 3060 I=1,NPIS
      IF(NPLANE(I,2).EQ.3) NPLANE(I,2)=0
      IF(NPLANE(I,2).EQ.9) NPLANE(I,2)=0
 3060 CONTINUE
C
C
C************************************************************
C****              CALENDAR UPDATE SEGMENT              ****
C************************************************************
C
C          THE FUNCTION OF THE CALENDAR UPDATE SEGMENT IS TO
C          UPDATE THE TIME STEP, TIME OF DAY AND DAY OF WEEK,
C          AS REQUIRED, AFTER EACH TIME STEP.  IT ALSO SHIFTS
C          THE PROGRAM TO TERMINATE IF THE REQUIRED NUMBER OF
C          TIME STEPS HAVE BEEN RUN, TO START RECORD RUNS IF
C          THE START UP PERIOD HAS BEEN COMPLETED AND TO
C          CHECK FOR A NEW MONTH ON THE FIRST HOUR OF EACH
C          NEW DAY AFTER THE START UP PERIOD HAS BEEN
C          COMPLETED
C
C
C          INCREASE THE TIME STEP COUNTER BY ONE
C
 5000 NCTS=NCTS+1
```

```
C
C        IF SUFFICIENT TIME STEPS HAVE BEEN RUN GO TO TER-
C        MINATE RUN.  IF NOT, CHANGE TIME OF DAY INDICATOR
C        AND DAY OF WEEK INDICATOR IF NECESSARY
C
      IF(NCTS.EQ.N) GO TO 5680
      NDAYTI=NDAYTI+1
      IF(NDAYTI.LT.25) GO TO 5020
      NDAYTI=1
      NDAY=NDAY+1
      IF(NDAY.LT.8) GO TO 5020
      NDAY=1
C
C        CHECK TO SEE IF IN START UP PERIOD AND IF SO,
C        WHETHER IT IS NOW COMPLETED.  IF NOT IN START UP
C        PERIOD AND NEW TIME OF DAY IS NOT 0100 JUST GO FOR
C        ANOTHER RUN.  IF THE TIME OF DAY IS 0100 GO TO
C        THE OCCURRENCE RATE CHANGE SEGMENT
C
 5020 IF(NSTUP.EQ.0) GO TO 5040
C
C        IF START UP PERIOD HAS JUST BEEN COMPLETED GO TO
C        ZERO THE REQUIRED TALLY COUNTERS AND MAKE FIRST
C        RUN FOR RECORD.  IF START UP PERIOD IS NOT COM-
C        PLETED YET JUST GO FOR ANOTHER RUN
C
      IF(NCTS.EQ.NSTUP) GO TO 5030
      GO TO 100
 5030 NSTUP=0
      GO TO 050
 5040 IF(NDAYTI.EQ.1) GO TO 5100
      GO TO 100
 5100 CONTINUE
C
C
C*****************************************************************
C****            OCCURRENCE RATE CHANGE SEGMENT              ****
C*****************************************************************
C
C
C        THE FUNCTION OF THE OCCURRENCE RATE CHANGE SEGMENT
C        IS TO DETERMINE WHEN A MONTH HAS BEEN COMPLETED,
C        IDENTIFY THE NEW MONTH AND CHANGE THE OCCURRENCE
C        RATE FACTOR INPUTS AND OTHER MONTHLY VARIABLE PA-
C        RAMETERS ACCORDINGLY.  ALSO, AT THE BEGINNING OF
C        THE THIRD MONTH (MARCH) ONE C-130 FROM THE NORTH-
C        ERN MOST STATION WITH C-130S IS DETACHED FOR ICE
C        PATROL THROUGH THE SIXTH MONTH (JUNE)
C
C
C        DETERMINE THE TIME STEP WITHIN THE YEAR OF RECORD
C        BEING RUN AND THEN SEE IF A NEW MONTH IS BEING
C        STARTED.  IF NOT, JUST GO TO MAKE ANOTHER RUN.  IF
C        A NEW MONTH IS STARTING GO TO IDENTIFY THE MONTH
C        AND CHANGE THE MONTHLY VARIABLE PARAMETERS
C
      NRATEC=NCTS-(8760*NYEAR)-NSTUPK
      IF(NYEAR.LT.10) GO TO 5101
      NRATEC=NRATEC-1
 5101 CONTINUE
      IF(NRATEC.EQ.745) GO TO 5120
      IF(NRATEC.EQ.1417) GO TO 5140
      IF(NRATEC.EQ.2161) GO TO 5500
      IF(NRATEC.EQ.2881) GO TO 5520
      IF(NRATEC.EQ.3625) GO TO 5540
      IF(NRATEC.EQ.4345) GO TO 5560
      IF(NRATEC.EQ.5089) GO TO 5580
      IF(NRATEC.EQ.5833) GO TO 5600
      IF(NRATEC.EQ.6553) GO TO 5620
      IF(NRATEC.EQ.7297) GO TO 5640
      IF(NRATEC.EQ.8017) GO TO 5660
      IF(NRATEC.EQ.8761) GO TO 5680
```

```
      GO TO 100
 5120 I=2
      GO TO 5720
C
C          ENTERING THE MONTH OF MARCH - MUST DETACH ONE
C          C-130 FOR ICE PATROL FROM THE NORTHERN MOST STA-
C          TION WITH C-130S.  TAKE THE FIRST C-130 IN THE
C          C-130 ACCOUNTING ARRAY, DETERMINE ITS CURRENT
C          STATUS AND ACT ACCORDINGLY (THIS IS THE C-130 TO
C          BE DETACHED FOR ICE PATROL)
C
 5140 IF(NPLANE(1,2).LT.4) GO TO 5420
      IF(NPLANE(1,2).EQ.4) GO TO 5160
      IF(NPLANE(1,2).LE.6) GO TO 5320
      GO TO 5420
C
C          THE C-130 BEING DETACHED IS ON A MISSION; FIND
C          WHICH MISSION
C
 5160 DO 5180 I=1,100
      IF(NMISSN(I,16).EQ.NPLANE(1,7)) GO TO 5200
 5180 CONTINUE
C
C          IF MISSION THE C-130 BEING DETACHED IS ON HAS MORE
C          THAN ONE AIRCRAFT ASSIGNED JUST CHANGE THE MISSION
C          ACCOUNTING VECTOR TO SHOW ONE LESS AIRCRAFT AS-
C          SIGNED - OTHERWISE CANCEL THE MISSION AND ZERO ITS
C          ACCOUNTING VECTOR
C
 5200 IF(NMISSN(I,11).GT.1) GO TO 5300
      DO 5240 J=I,100
      IF(NMISSN(J+1,1).EQ.0) GO TO 5260
      DO 5220 M=1,16
      NMISSN(J,M)=NMISSN(J+1,M)
 5220 CONTINUE
 5240 CONTINUE
 5260 DO 5280 M=1,16
      NMISSN(J,M)=0
 5280 CONTINUE
      GO TO 5420
 5300 NMISSN(I,11)=NMISSN(I,11)-1
      GO TO 5420
C
C          THE C-130 BEING DETACHED IS ON A CASE; FIND WHICH
C          CASE
C
 5320 DO 5340 I=1,50
      IF(NCASE(I,16).EQ.NPLANE(1,6)) GO TO 5360
 5340 CONTINUE
C
C          FIND OUT WHETHER THE C-130 WAS ENROUTE TO, RETURN-
C          ING FROM, OR ON SCENE AND ADJUST THE CASE ACCOUNT-
C          ING VECTOR ACCORDINGLY.  THEN DETERMINE TAKE OFF
C          TIME FOR NEXT C-130 TO GO ON CASE DEPENDING ON
C          WHETHER IT IS A CONTINUOUS ON-SCENE RELIEF CASE OR
C          NOT AND TALLY FLYING TIME
C
 5360 IF(NPLANE(1,2).EQ.5) GO TO 5380
      NCASE(I,17)=NCASE(I,17)-1
 5380 NCASE(I,11)=NCASE(I,11)-1
      IF(NCASE(I,2).EQ.1) GO TO 5400
      NCASE(I,9)=NCTS+5
      GO TO 5420
 5400 NCASE(I,9)=NCTS
 5420 IF(NPLANE(1,2).LE.4) GO TO 5440
      IF(NPLANE(1,2).EQ.8) GO TO 5440
      NFLYTI=NFLYTI+NCTS-NPLANE(1,10)
C
C          LOAD C-130'S ACCOUNTING VECTOR TO REFLECT IT IS ON
C          A MISSION, TO RETURN THE FIRST OF JULY, SET MAX
C          MISSION NUMBER SO IT WILL HAVE NO AFFECT ON THE
C          REST OF THE PROGRAM, INDICATE IT IS TO RETURN TO
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```
C          ITS HOME STATION WHEN ICE PATROL COMPLETED AND ITS
C          TIME OF DEPARTURE ON ICE PATROL AS CURRENT TIME
C          STEP
C
 5440 NPLANE(1,2)=4
      NPLANE(1,4)=4344+(8760*NYEAR)
      NPLANE(1,5)=7
      NPLANE(1,7)=999999
      NPLANE(1,8)=NPLANE(1,1)
      NPLANE(1,10)=NCTS
C
C          IF THERE WERE NO C-130S ASSIGNED TO THE NORTHERN
C          MOST C-130 STATION DETERMINE STATION C-130 CAME
C          FROM AND COMPUTE EXTRA FLYING HOURS CORRECTED FOR
C          FLYING AIRWAYS VS DIRECT FOR AN AVERAGE OF 10
C          ROUND TRIPS TO ICE PATROL BASE FROM HOME STATION
C          DURING THE SEASON AND TALLY.  ALSO TALLY 500 MIS-
C          SION HOURS FLOWN ON ICE PATROL
C
      IF(NPN.GT.0) GO TO 5480
      IF(NPC.GT.0) GO TO 5460
      XHRS=20.0*(FLOAT(LAC(1)-LAC(3))/290.0)*1.1975
      XHRST=XHRST+XHRS
      GO TO 5480
 5460 XHRS=20.0*(FLOAT(LAC(1)-LAC(2))/290.0)*1.1975
      XHRST=XHRST+XHRS
 5480 NUMFHR=NUMFHR+500
      I=3
      GO TO 5720
 5500 I=4
      GO TO 5720
 5520 I=5
      GO TO 5720
 5540 I=6
      GO TO 5720
 5560 I=7
      GO TO 5720
 5580 I=8
      GO TO 5720
 5600 I=9
      GO TO 5720
 5620 I=10
      GO TO 5720
 5640 I=11
      GO TO 5720
 5660 I=12
      GO TO 5720
C
C          BEGINNING NEW YEAR, INCREASE YEAR COUNTER BY ONE
C          TO INDICATE THE NUMBER OF YEARS COMPLETED - IF
C          SUFFICIENT TIME STEPS HAVE BEEN COMPLETED GO TO
C          PUBLISH FINAL STATISTICS
C
 5680 NYEAR=NYEAR+1
 5700 I=1
      IF(NCTS.EQ.N) GO TO 5800
C
C          SET ALL MONTHLY VARIABLE PARAMETERS FOR MONTH
C          THAT IS JUST BEGINNING
C
 5720 PCL(1)=TMONTH(I,5)
      PCL(2)=PCL(1)+TMONTH(I,6)
      PCL(3)=1.0
      PCNN=TMONTH(I,4)
      NPSDIW=TMONTH(I,10)
      PCSS=TMONTH(I,8)
      PCGULF=TMONTH(I,9)
      PCSOU=PCSS+PCGULF
      PSCDPD=TMONTH(I,3)
      TSCPYA=(365.0/TMONTH(I,11))*(FLOAT(NSCPY))*TMONTH(I,1)
      TMPYA=(365.0/TMONTH(I,11))*(FLOAT(NNSCPY))*TMONTH
     1(I,2)
```

```
      MONTH=I
      IF(NSTUP.EQ.0) GO TO 5800
      M=1
      WRITE(6,9002) M
      GO TO 80
C
C
C**********************************************************************
C****                      STATISTICS SEGMENT                     ****
C**********************************************************************
C
C          THE FUNCTION OF THE STATISTICS SEGMENT IS TO GATH-
C          ER VITAL STATISTICS (DOWN TIME, MISSION AND CASE
C          ON-SCENE HOURS NOT FLOWN, EXTRA FLIGHT HOURS,
C          OVERNIGHT STAYS, ETC.) FOR INDIVIDUAL MONTHS AND
C          REPLICATION YEARS AND TO PUBLISH THE STATISTICS AS
C          INDICATED
C
C
C
 5800 M=I-1
      IF(M.EQ.0) M=12
C
C          IF MONTH JUST COMPLETED WAS JANUARY WRITE HEADING
C          FOR MONTHLY STATISTICS OF NEW REPLICATION YEAR
C
      IF(M.GT.1) GO TO 5820
      WRITE(6,9003)
C
C          DETERMINE STATISTICS FOR THE MONTH JUST COMPLETED
C          AND PUBLISH THEM
C
 5820 NDOW=NDOWTI-NDOWS
      NDOWT(M)=NDOWT(M)+NDOW
      NMHL=NMHLST-NMHLS
      NMHLT(M)=NMHLT(M)+NMHL
      NSHL=NOSHNC-NSHLS
      NSHLT(M)=NSHLT(M)+NSHL
      XOURS=XHRST-XOURSS
      XOURST(M)=XOURST(M)+XOURS
      DO 5840 J=1,3
      NONA(J)=NRONA(J)-NONAS(J)
      NONAT(M,J)=NONAT(M,J)+NONA(J)
      NONF(J)=NRONF(J)-NONFS(J)
      NONFT(M,J)=NONFT(M,J)+NONF(J)
 5840 CONTINUE
      WRITE(6,9004) M,NDOW,NMHL,NSHL,XOURS,(NONA(J),J=1,3),
     1(NONF(J),J=1,3)
C
C          STORE TOTAL STATISTICS GATHERED TO END OF MONTH
C          JUST COMPLETED
C
      NDOWS=NDOWTI
      NMHLS=NMHLST
      NSHLS=NOSHNC
      XOURSS=XHRST
      DO 5850 L=1,3
      NONAS(L)=NRONA(L)
      NONFS(L)=NRONF(L)
 5850 CONTINUE
C
C          IF NOT STARTING A NEW YEAR GO TO BEGIN RUNS FOR
C          NEW MONTH
C
      IF(I.NE.1) GO TO 5900
C
C          BEGINNING A NEW YEAR SO DETERMINE STATISTICS FOR
C          THE YEAR JUST COMPLETED AND PUBLISH THEM
C
      NDOWY=NDOWS-NDOWYS
      NMHLY=NMHLS-NMHLYS
      NSHLY=NSHLS-NSHLYS
      XOURY=XOURSS-XOURYS
```

```
      DO 5860 L=1,3
      NONAY(L)=NONAS(L)-NONAYS(L)
      NONFY(L)=NONFS(L)-NONFYS(L)
 5860 CONTINUE
      WRITE(6,9005) NYEAR
      WRITE(6,9006)
      WRITE(6,9007) NDOWY,NMHLY,NSHLY,XOURY,
     1(NONAY(J),J=1,3),(NONFY(J),J=1,3)
C
C         STORE TOTAL STATISTICS GATHERED TO END OF YEAR
C         JUST COMPLETED AND DETERMINE VARIANCES
C
      M=NYEAR+1
      WRITE(6,9002) M
      NRONTY=NONAY(1)+NONAY(2)+NONAY(3)
      NMHSS=NMHSS+(NMHLY**2)
      NSHSS=NSHSS+(NSHLY**2)
      XOSS=XOSS+(XOURY**2)
      NRONSS=NRONSS+(NRONTY**2)
      NDOWYS=NDOWS
      NMHLYS=NMHLS
      NSHLYS=NSHLS
      XOURYS=XOURSS
      DO 5880 L=1,3
      NONAYS(L)=NONAS(L)
      NONFYS(L)=NONFS(L)
 5880 CONTINUE
      VMMH=FLOAT(NMHLS)/FLOAT(NYEAR)
      VMSH=FLOAT(NSHLS)/FLOAT(NYEAR)
      VMXO=XOURSS/FLOAT(NYEAR)
      VMRON=FLOAT(NRONA(1)+NRONA(2)+NRONA(3))/FLOAT(NYEAR)
      VARM=(VMMH**2)*((NMHSS/(FLOAT(NYEAR)*(VMMH**2)))-1.0)
      VARS=(VMSH**2)*((NSHSS/(FLOAT(NYEAR)*(VMSH**2)))-1.0)
      VARX=(VMXO**2)*((XOSS/(FLOAT(NYEAR)*(VMXO**2)))-1.0)
      VARR=(VMRON**2)*((NRONSS/(FLOAT(NYEAR)*(VMRON**2)))-
     11.0)
C
C         IF COMPLETING THE TENTH REPLICATION YEAR DETERMINE
C         TOTAL NUMBER OF REPLICATIONS REQUIRED FOR CON-
C         FIDENCE LEVEL AND UNCERTAINTY LIMIT SPECIFIED AND
C         CHANGE TERMINATION TIME STEP INDICATOR ACCORDINGLY
C
      IF(NYEAR.NE.10) GO TO 5890
      NYCALM=((VARM/(VMMH**2))*((CONF/ERROR)**2))+1.0
      NYCALS=((VARS/(VMSH**2))*((CONF/ERROR)**2))+1.0
      NYCALX=((VARX/(VMXO**2))*((CONF/ERROR)**2))+1.0
      NYCALR=((VARR/(VMRON**2))*((CONF/ERROR)**2))+1.0
      NYIT=NYCALM
      IF(NYIT.LT.NYCALS) NYIT=NYCALS
      IF(NYIT.LT.NYCALX) NYIT=NYCALX
      IF(NYIT.LT.NYCALR) NYIT=NYCALR
      N=(NYIT*8760)+NSTUPK
      IF(N.LT.87600+NSTUPK) N=87600+NSTUPK
      WRITE(6,9016) NYCALM,NYCALS,NYCALX,NYCALR
 5890 CONTINUE
      IF(NCTS.EQ.N) GO TO 5920
 5900 GO TO 080
C
C         SUFFICIENT NUMBER OF TIME STEPS HAVE BEEN COMPLET-
C         ED SO CALCULATE THE MEAN AND VARIANCE STATISTICS
C         FOR THE REPLICATION MONTHS AND YEARS RUN AND PUB-
C         LISH THEM
C
 5920 SNSYR=FLOAT(NCTS-NSTUPK)/(365.0*24.0)
      IF(SNSYR/NYEAR.NE.1) GO TO 5980
      WRITE(6,9010) NYEAR
      WRITE(6,9013)
      DO 5960 J=1,12
      ADOWT=FLOAT(NDOWT(J))/SNSYR
      AMHL=FLOAT(NMHLT(J))/SNSYR
      ASHL=FLOAT(NSHLT(J))/SNSYR
      AXOURS=XOURST(J)/SNSYR
```

```
      DO 5940 L=1,3
      ANONA(L)=FLOAT(NONAT(J,L))/SNSYR
      ANONF(L)=FLOAT(NONFT(J,L))/SNSYR
 5940 CONTINUE
      WRITE(6,9008) J,ADOWT,AMHL,ASHL,AXCURS,
     1(ANONA(L),L=1,3),(ANONF(L),L=1,3)
 5960 CONTINUE
 5980 ADOWT=FLOAT(NDOWS)/SNSYR
      AMHL=FLOAT(NMHLS)/SNSYR
      ASHL=FLOAT(NSHLS)/SNSYR
      AXCURS=XOURSS/SNSYR
      DO 6000 L=1,3
      ANONA(L)=FLOAT(NONAS(L))/SNSYR
      ANONF(L)=FLOAT(NONFS(L))/SNSYR
 6000 CONTINUE
      RONT=ANONA(1)+ANONA(2)+ANONA(3)
      WRITE(6,9011) SNSYR
      WRITE(6,9012)
      WRITE(6,9009) ADOWT,AMHL,ASHL,AXCURS,
     1(ANONA(L),L=1,3),(ANONF(L),L=1,3),RONT
      WRITE(6,9015) VARM,VARS,VARX,VARR
      SVARM=SQRT(VARM)
      SVARS=SQRT(VARS)
      SVARX=SQRT(VARX)
      SVARR=SQRT(VARR)
      WRITE(6,9033) SVARM,SVARS,SVARX,SVARR
      THRAV=SNSYR*FLOAT(NPIS)*8760.0
      DOWAV=FLOAT(NDOWTI)/THRAV
      FHPMAV=FLOAT(NUMFHR)/FLOAT(NM)
      FHPCAV=FLOAT(NUSFHR)/FLOAT(NC)
      FHMPYA=FLOAT(NUMFHR)/SNSYR
      FHCPYA=FLOAT(NUSFHR)/SNSYR
      ACPY=FLOAT(NC)/SNSYR
      AMPY=FLOAT(NM)/SNSYR
      AVFHNU=(THRAV/SNSYR)-ADOWT+AMHL+ASHL-AXCURS-FHMPYA-
     1FHCPYA
      WRITE(6,9014) ACPY,FHCPYA,FHPCAV,AMPY,FHMPYA,FHPMAV,
     1DOWAV,AVFHNU
      IF(NRUN.EQ.NRUNS) GO TO 8900
      NRUN=NRUN+1
      READ(5,7023) N,NSTUP,NPN,NPC,NPS
 7023 FORMAT(5I10)
      GO TO 7600
 8900 NCTS=NCTS-NSTUPK
C
C           PUBLISH CASE AND MISSION TOTALS BY TYPES THAT WERE
C           GENERATED DURING THE TIME STEPS RUN FOR RECORD,
C           NOT INCLUDING START UP, AND THEN TERMINATE THE RUN
C
      WRITE(6,9000) NCTS,NSSMSC,NODSC,NSPL,NRNSC
      WRITE(6,9034) IA,IB,IC,ID,IE,IF
 9000 FORMAT(///6X,' DURING',I6,' TIME STEPS THE FOLLOWING',
     1' CASES AND MISSIONS WERE GENERATED:',/10X,I6,' PEAK',
     2' RATE DAY SAR CASES',/10X,I6,' NON-PEAK RATE DAY ',
     3' SAR CASES',/10X,I6,' SPECIAL NON-SAR MISSIONS',
     4/10X,I6,' REGULAR NON-SAR MISSIONS')
 9002 FORMAT('1',46X,' MONTHLY RESULTS FOR YEAR',I3)
 9003 FORMAT(///8X,' MONTH',5X,'DOWN',7X,'MHL',6X,'CSHL',7X,
     1'EFH',5X,'RONA 1',4X,'RONA 2',4X,'RONA 3',4X,'RONF 1',
     24X,'RONF 2',4X,'RONF 3')
 9004 FORMAT(/9X,I2,7X,I4,6X,I4,6X,I4,4X,F8.2,5X,I3,7X,I3,
     17X,I3,7X,I3,7X,I3,7X,I3)
 9005 FORMAT(///41X,' SUMMARY RESULTS FOR YEAR',I3)
 9006 FORMAT(//8X,' DOWN',7X,'MHL',6X,'CSHL',7X,'EFH',6X,
     1'RONA 1',4X,'RONA 2',4X,'RONA 3',4X,'RONF 1',4X,
     1'RONF 2',4X,'RONF 3',6X,'RONT')
 9007 FORMAT(/8X,I4,6X,I5,6X,I4,4X,F8.2,5X,I3,7X,I3,7X,I3,
     17X,I3,7X,I3,7X,I3,7X,I4)
 9008 FORMAT(/9X,I2,5X,F8.2,3X,F8.2,3X,F8.2,3X,F8.2,3X,
     1F8.2,3X,F8.2,3X,F8.2,3X,F8.2,3X,F8.2,3X,F8.2)
 9009 FORMAT(/6X,F8.2,3X,F8.2,3X,F8.2,3X,F8.2,3X,F8.2,3X,
     1F8.2,3X,F8.2,3X,F8.2,3X,F8.2,3X,F8.2,2X,F8.2)
```

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9010 FORMAT(///,23X,' MEAN SUMMARY DATA FOR MONTHS USING',
    1I3,' REPLICATION YEARS')
9011 FORMAT(///23X,' MEAN SUMMARY DATA FOR YEAR USING',
    1F6.2,' REPLICATION YEARS')
9012 FORMAT(//8X,' DOWN',7X,'MHL',7X,'OSHL',8X,'EFH',7X,
    1'RONA 1',5X,'RONA 2',5X,'RONA 3',5X,'RONF 1',5X,
    2'RONF 2',5X,'RONF 3',5X,'RONT')
9013 FORMAT(///7X,' MONTH',5X,'DOWN',9X,'MHL',7X,'OSHL',8X,
    1'EFH',7X,'RONA 1',5X,'RONA 2',5X,'RONA 3',5X,'RONF 1',
    25X,'RONF 2',5X,'RONF 3')
9014 FORMAT(//32X,' NUMBER OF CASES',18X,'=',F10.2,/32X,
    1' NUMBER OF ON SCENE HOURS',9X,'=',F10.2,/36X,
    2' REQUESTED',/32X,' MEAN NUMBER OF ON SCENE HOURS',4X,
    3'=',F10.2,/36X,' REQUESTED PER CASE',/32X,' NUMBER O',
    4'F MISSIONS',15X,'=',F10.2,/32X,' NUMBER OF FLIGHT ',
    5'HOURS REQUESTED =',F10.2,/36X,' FOR MISSIONS',/32X,
    6' MEAN NUMBER OF FLIGHT HOURS',6X,'=',F10.2,/36X,' R',
    7'EQUESTED PER MISSION',/32X,' PROPORTION OF TOTAL AV',
    8'AILABLE',4X,'=',F10.4,/36X,' HOURS THAT C-130S WERE',
    9' DOWN',/32X,' TOTAL POTENTIAL FLIGHT HOURS',5X,'=',
    1F10.2,/36X,' NOT USED')
9015 FORMAT(/6X,' VAR',6X,2F12.2,F11.2,62X,F11.2)
9016 FORMAT(/20X,' ITERATION CALCULATION RESULTS',/30X,
    1' MHL  =',I3,/30X,' OSHL =',I3,/30X,' EFH  =',I3,/30X,
    2' RONT =',I3)
9017 FORMAT('1',5X,'THE FOLLOWING PARAMETERS HAVE BEEN ',
    1'SET FOR THE ATTACHED RUNS',///8X,' CASE DATA')
9018 FORMAT(10X,'NUMBER OF CASES PER YEAR =',I4,/10X,
    1' CASE PRIORITY PROBABILITY DISTRIBUTION (1-3) =',
    23F5.2,/10X,' MEAN DISTANCE FROM COAST =',F6.2,
    3/10X,' MEAN DISTANCE NORTH =',F6.2,/10X,' PROB. OF',
    4' HELO SUBSTITUTION =',F5.2)
9019 FORMAT(10X,'PRIORITY ONE C-130 REQ. DIST. (1-4) =',
    24F5.2,/10X,' PRIORITY TWO C-130 REQ. DIST. (1-3) =',
    33F5.2,/10X,' PROB ONLY ONE C-130 REQ. ON A PRIORITY',
    4' THREE CASE =',F5.2)
9020 FORMAT(/8X,' MISSION DATA',/10X,' NUMBER OF MISSIONS',
    1' PER YEAR =',I5,/10X,' PROPORTION THAT ARE SPECIAL',
    2' =',F5.2)
9021 FORMAT(10X,'PRIORITY PROB. DIST. FOR REG. MISSIONS',
    1' (1-3) =',3F5.2,/10X,' HOLD PROBABILITIES BY PRI',
    2'ORITIES (1,2,S) =',3F5.2,/10X,' PROP. OF SPECIALS',
    3' THAT ARE DEPLOYMENT SAR CASES =',F5.2,/10X,' PROB.',
    4' THAT DURATION OF A PRI 3 MISSION > 1 DAY =',F5.2)
9022 FORMAT(10X,'DEPLOYMENT SAR MISSION REQ. C-130 PROB.',
    1' DIST. (1-3) =',3F5.2,/10X,' PROB. DIST. FOR ',
    2'STATION NEAREST DEP. SAR MISSION (N,C,S) =',3F5.2,
    3/10X,' PROB. OF HELO SUB ON NON-DEP MISSION =',F5.2)
9023 FORMAT(10X,'PROB. DIST. FOR NON-DEP MISSION PICK',
    1' UP POINTS:',/15X,' BOSTON =',F5.2,7X,'CENTRAL',
    2' =',F5.2,/15X,' NORTHERN =',F5.2,5X,'SOUTHERN =',
    3F5.2,/15X,' ACADEMY =',F5.2,6X,'MIAMI =',F5.2,/15X,
    4' NEW YORK =',F5.2,5X,'NEW ORLEANS =',F5.2,/15X,
    5' WASHINGTON =',F5.2,3X,'COAST =',F5.2,/15X,
    6' NORFOLK =',F5.2)
9024 FORMAT(10X,'PRI. 1 MISSION DAYS (PARTIAL) PROB.',
    2' DIST. (1-4) =',4F5.2,/10X,' PRI. 2 MISSION',
    3' 12 HOUR PERIOD DURATION PROB. DIST. (1-6) =',
    46F5.2,/10X,' PRI. 3 MISSION > 1 DAY - 3 DAY',
    5' PERIOD DURATION PROB. DIST. (1-15) = :',/15X,
    615F5.2)
9025 FORMAT(/8X,' MAINTENANCE DISCREPANCY DATA',/10X,
    1' PROBABILITY DOWN AFTER LANDING =',F5.2,/10X,
    2' PROBABILITY ABORT FLIGHT DUE MECH. (HOURLY) =',
    3F5.2,/10X,' PROBABILITY DOWN ON START =',F5.2)
9026 FORMAT(10X,'PROB. DIST. OF DOWN HRS (NORMAL)',
    1' (2-4-8-24-72) =',5F5.2,/10X,' PROB. DIST. OF',
    2' DOWN HRS (ABORT) (4-8-24-36) =',4F5.2,/10X,
    3' PROB. DIST. OF DOWN HRS (START) (2-4-8-24-72) =',
    45F5.2)
9027 FORMAT(//8X,' HELICOPTER STATION DATA',//10X,' C130 ',
    1' HH-3FS  HH-52S  HH-3F   HH-52   HH-52',/10X,
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    2' AREA  ASSIGN  ASSIGN   NA',6X,'NA',6X,'2A')
9028 FORMAT(10X,I3,4X,I2,6X,I2,6X,I2,6X,I2,6X,I2)
9029 FORMAT(///8X,' MONTHLY VARIABLE INPUT DATA',//9X,
    2' MON  PSC  PM  PPSD  PNM  PFD PTFC PSED PSCL',
    3' GULF PDIW  DIM')
9030 FORMAT(/10X,I2,1X,10F5.2,F5.0)
9031 FORMAT(///8X,' START UP PERIOD =',I4,' DAYS',
    1//8X,' CONFIDENCE COEFFICIENT =',F5.2,//8X,
    2' MAX LEVEL OF ERROR =',F5.2)
9032 FORMAT('1',5X,'ALLOCATION OF C-130S FOR RUN',I3,
    1///10X,' NORTHERN =',I2,//10X,' CENTRAL  =',I2,
    2//10X,' SOUTHERN =',I2)
9033 FORMAT(/6X,' STD',6X,2F12.2,F11.2,62X,F11.2)
9034 FORMAT(///5X,' FINAL VALUE OF RANDOM NUMBER SEEDS:',
    1//10X,' IA = ',I16,//10X,' IB = ',I16,//10X,' IC = ',
    2I16,//10X,' ID = ',I16,//10X,' IE = ',I16,//10X,
    3' IF = ',I16)
     STOP
     END
```

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C*******************************************************
C****                                              ****
C****                SUBROUTINE MICA               ****
C****                                              ****
C*******************************************************
C
C
C         THE KEY CALLING PARAMETERS FOR SUBROUTINE MICA ARE
C         THE NUMBER OF SAR CASES TO DEVELOP (NSCTD), THE
C         TIME OF A SPECIAL MISSION (NSPNST), AND/OR NUMBER
C         OF REGULAR MISSIONS TO DEVELOP (NNSCTD).
C
C         THE FUNCTION OF SUBROUTINE MICA IS TO DETERMINE
C         EACH FACET OF ALL CASES AND MISSIONS AND TO LOAD
C         THE RESPECTIVE MISSION OR CASE VECTORS.  FOR A
C         CASE, THE FOLLOWING INFORMATION IS DETERMINED:
C         PRIORITY, CONTINUOUS ON-SCENE RELIEF OR NOT, LAT-
C         ITUDE AND LONGITUDE OF CASE SCENE IN NAUTICAL
C         MILES FROM SIMULATED COAST LINE AND BASE LINE,
C         WHETHER A CASE IS IN POTENTIAL RANGE AND IS SUIT-
C         ABLE FOR HELICOPTER SUBSTITUTION OF C-130S IF
C         NECESSARY, THE CLOSEST C-130 STATION TO THE CASE,
C         THE DISTANCES OF ALL C-130 STATIONS FROM THE CASE,
C         THE NUMBER OF C-130S REQUIRED, TOTAL ON-SCENE
C         FLIGHT HOURS REQUIRED, TIME OF FIRST C-130 TAKE
C         OFF AND TIME CASE IS TO CLOSE.  FOR A MISSION, THE
C         FOLLOWING INFORMATION IS DETERMINED:  PRIORITY,
C         WHETHER IT CAN BE HELD PAST SCHEDULED TAKE OFF
C         TIME WITHOUT BEING CANCELLED AND, IF SO, FOR HOW
C         MANY HOURS, LATITUDE AND LONGITUDE OF MISSION
C         PICK UP POINT IN NAUTICAL MILES FROM SIMULATED
C         COAST LINE AND BASE LINE, WHETHER MISSION IS OF
C         TYPE WHICH IS SUITABLE FOR A HELICOPTER SUBSTITU-
C         TION OF A C-130 IF NECESSARY, NEAREST C-130 STA-
C         TION TO THE MISSION PICK UP POINT AND THE DISTANCE
C         OF ALL C-130 STATIONS FROM THE MISSION PICK UP
C         POINT, NUMBER OF C-130S REQUIRED, TOTAL MISSION
C         FLIGHT HOURS, TIME MISSION CLOSES, AND TOTAL TIME
C         STEPS THAT MISSION IS UNDERWAY.  THE DEPARTURE
C         TIME OF THE AIRCRAFT FOR MISSIONS IS DETERMINED IN
C         THE MAIN PROGRAM.
C
C
      DIMENSION NCAS(850),LF(3),NMISS(1600)
      COMMON/INFO1/TCP(3),PCL(3),PCSC,PSCI,PSSC,PCSCU,PCNN,
     1PCGULF,Z,CDFA(4),CDFB(3),CDFC,PRI(3),PHOLD1,PHOLD2,
     2PSC,PPSC(3),PHOLD,PMEDIC,PMSC(3),PPUP(11),PSUBM,
     3QND1(4),QND2(6),QND3(15),PTAD,TSPDF(5),ALON,ALATN
      COMMON/INFO2/IC,NSCTD,NCASE(50,17),NCTS,K,LAC(3),
     1NDAYTI,NM,ID,LOC(9),NSPNST,NNSCTD,NMISSN(100,16),NC
      COMMON/INFO8/NUMFHR,NUSFHR,NDSC
      EQUIVALENCE (NCASE(1,1),NCAS(1))
      EQUIVALENCE (NMISSN(1,1),NMISS(1))
C
C         IF CASES MUST BE DEVELOPED GO TO SAR CASE SECTION
C
 5000 IF(NSCTD.GT.0) GO TO 5250
C
C         THERE ARE NO CASES TO BE DEVELOPED.  ZERO C-130S
C         REQUIRED INDICATOR AND SEE IF THERE ARE ANY MISS-
C         IONS TO BE DETERMINED.  IF NOT, RETURN - OTHERWISE
C         IF THERE IS A SPECIAL MISSION TO BE DEVELOPED GO
C         TO SPECIAL MISSION SECTION, IF REGULAR MISSION TO
C         BE DEVELOPED CONTINUE
C
 5004 JDENT7=0
      IF(NSPNST.GT.0) GO TO 5040
      IF(NNSCTD.GT.0) GO TO 5008
```

```
      RETURN
C
C         DEVELOPING A REGULAR MISSION.  INCREASE TOTAL
C         MISSION COUNTER BY ONE AND DETERMINE PRIORITY OF
C         THE MISSION AND STORE
C
 5008 ID=ID*K
      RP=0.5+FLOAT(ID)*Z
      NM=NM+1
      DO 5012 J=1,3
      IF(RP.LE.PRI(J)) GO TO 5016
 5012 CONTINUE
 5016 JDENT1=J
C
C         DETERMINE NUMBER OF TIME STEPS THAT THE MISSION
C         CAN BE HELD PAST THE SCHEDULED TAKE OFF TIME WITH-
C         OUT BEING CANCELLED, CONSIDERING MISSION PRIORITY
C
      ID=ID*K
      RH=0.5+FLOAT(ID)*Z
      IF(JDENT1.GT.2) GO TO 5032
      IF(JDENT1.GT.1) GO TO 5024
C
C         HAVE A PRIORITY ONE MISSION.  DETERMINE IF IT CAN
C         BE HELD OR NOT AND IF SO, FOR HOW MANY TIME STEPS
C         DEPENDING ON TIME OF DAY
C
      IF(RH.GT.PHOLD1) GO TO 5036
      IF(NDAYTI.EQ.12) GO TO 5020
      JDENT2=4
      GO TO 5068
 5020 JDENT2=20
      GO TO 5068
C
C         HAVE A PRIORITY TWO MISSION.  DETERMINE IF IT CAN
C         BE HELD OR NOT AND IF SO, FOR HOW MANY TIME STEPS
C         DEPENDING ON TIME OF DAY
C
 5024 IF(RH.GT.PHOLD2) GO TO 5036
      IF(NDAYTI.EQ.12) GO TO 5028
      JDENT2=28
      GO TO 5068
 5028 JDENT2=24
      GO TO 5068
C
C         HAVE A PRIORITY THREE MISSION.  IT CAN BE HELD FOR
C         48 TIME STEPS IF NECESSARY SO STORE THIS FACT
C
 5032 JDENT2=48
      GO TO 5068
C
C         EITHER A PRIORITY ONE OR TWO MISSION CAN NOT BE
C         HELD BEYOND THE REGULAR TAKE OFF TIME SO STORE
C         THIS INFORMATION
C
 5036 JDENT2=0
      GO TO 5068
C
C         HAVE A SPECIAL MISSION.  IT IS A PRIORITY ONE
C         MISSION.  STORE THIS FACT, INCREASE TOTAL MISSION
C         COUNTER BY ONE AND DETERMINE WHETHER THE SPECIAL
C         MISSION IS A DEPLOYMENT SAR CASE OR NOT
C
 5040 JDENT1=1
      NM=NM+1
      ID=ID*K
      RH=0.5+FLOAT(ID)*Z
      ID=ID*K
      RS=0.5+FLOAT(ID)*Z
      IF(RS.GT.PSC) GO TO 5052
C
C         SPECIAL MISSION IS DEPLOYMENT SAR CASE.  INITIAL-
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C          IZE INDICATOR SHOWING THIS, DETERMINE NUMBER OF
C          AIRCRAFT REQUIRED AND SPECIFY A POSSIBLE HOLD TIME
C          OF 12 HOURS
C
      NCSC=1
      ID=ID*K
      RS=0.5+FLOAT(ID)*Z
      DC 5044 J=1,3
      IF(RS.LE.PPSC(J)) GC TO 5048
 5044 CCNTINUE
 5048 JDENT7=J
      JDENT2=12
      GC TO 5068
C
C          SPECIAL MISSION IS NOT A DEPLOYMENT SAR CASE.
C          DETERMINE IF THE SPECIAL MISSION CAN BE HELD.  IF
C          SO, CONTINUE, IF NCT GO TO SEE IF IT IS A MEDICAL
C          EVACUATION MISSION
C
 5052 IF(RH.GT.PHOLD) GO TO 5060
C
C          SPECIAL MISSION CAN BE HELD FCR EITHER ONE OR TWO
C          HOURS.  DETERMINE WHICH AND STCRE
C
      ID=ID*K
      RH=0.5+FLOAT(ID)*Z
      IF(RH.GT.0.5) GO TO 5056
      JDENT2=1
      GO TO 5064
 5056 JDENT2=2
      GC TO 5064
C
C          THE SPECIAL MISSION IS NOT A DEPLOYMENT SAR CASE
C          AND CAN NOT BE HELD.  DETERMINE IF IT IS A MED-
C          ICAL EVACUATION MISSION - IF SO, GO TO DETERMINE
C          LOCATION OF MISSION.  IF NOT, CONTINUE
C
 5060 JDENT2=0
 5064 ID=ID*K
      RM=0.5+FLOAT(ID)*Z
      IF(RM.LE.PMEDIC) GO TO 5090
 5068 ID=ID*K
      RL=0.5+FLOAT(ID)*Z
C
C          IF NOT DEVELOPING A SPECIAL, SAR CASE DEPLOYMENT,
C          MISSION GO TO DETERMINE MISSION PICK UP POINT -
C          OTHERWISE CONTINUE
C
      IF(JDENT7.EQ.0) GO TO 5072
C
C          DETERMINE WHICH C-130 STATION IS THE CLOSEST TO
C          THE DEPLOYMENT SAR CASE AND STORE THAT INFORMATION
C
      IF(RL.GT.PMSC(2)) JDENT3=LAC(3)
      IF(RL.GT.PMSC(1)) JDENT3=LAC(2)
      IF(JDENT3.EQ.0) JDENT3=LAC(1)
      GC TO 5082
C
C          HAVE A REGULAR MISSION OR A SPECIAL MISSION THAT
C          IS NEITHER A MEDICAL EVACUATION NOR A DEPLOYMENT
C          SAR CASE.  DETERMINE MISSION PICK UP LOCATION
C
 5072 DC 5076 J=1,11
      IF(RL.LE.PPUP(J)) GC TO 5080
 5076 CONTINUE
 5080 IF(J.EQ.9) GO TO 5084
      IF(J.EQ.10) GO TO 5086
      IF(J.EQ.11) GO TO 5090
      JDENT3=LCC(J)
 5082 JDENT4=0
      GC TO 5098
 5084 JDENT3=595
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      JDENT4=155
      GO TO 5098
 5086 JDENT3=625
      JDENT4=-505
      GO TO 5098
C
C          EITHER DEVELOPING A SPECIAL MEDICAL EVACUATION OR
C          OTHER MISSION WHOSE PICK UP POINT IS POSSIBLY AT
C          SOME NON-STANDARD LOCATION.  DETERMINE MISSION
C          PICK UP POINT
C
 5090 ID=ID*K
      RG=0.5+FLOAT(ID)*Z
      ID=ID*K
      RX=0.5+FLOAT(ID)*Z
      IF(RG.LE.0.30) GO TO 5094
      JDENT3=480.0+(RX*1640.0)
      JDENT4=0
      GO TO 5098
 5094 JDENT3=625
      JDENT4=RX*(-505.0)
C
C          FOR WHATEVER TYPE MISSION BEING DEVELOPED, DETER-
C          MINE THE C-130 STATION CLOSEST TO THE PICK UP
C          POINT
C
 5098 CONTINUE
 5106 DO 5110 L=1,3
      LF(L)=SQRT((FLOAT(JDENT4)**2)+(FLOAT(LAC(L)-JDENT3)
     1**2))
 5110 CONTINUE
      IF(LF(1).LE.LF(2)) GO TO 5114
      IF(LF(2).LE.LF(3)) GO TO 5118
      JDENT6=3
      GO TO 5122
 5114 JDENT6=1
      GO TO 5122
 5118 JDENT6=2
 5122 ID=ID*K
      RT=0.5+FLOAT(ID)*Z
      IF(JDENT7.EQ.0) GO TO 5142
C
C          DEVELOPING A SPECIAL DEPLOYMENT SAR CASE.  DETER-
C          MINE NUMBER OF TOTAL HOURS MISSION WILL BE UNDER-
C          WAY AND NUMBER OF FLIGHT HOURS REQUIRED PER C-130
C
      DO 5126 L=1,4
      IF(RT.LT.QND1(L)) GO TO 5130
 5126 CONTINUE
 5130 NDG=L
      IF(NDAYTI.LE.12) GO TO 5134
      JDEN15=(24-NDAYTI)+L*24
      GO TO 5138
 5134 JDEN15=((L-1)*24)+24-NDAYTI
 5138 JDENT8=L*10
      GO TO 5186
 5142 IF(JDENT1.GT.1) GO TO 5150
C
C          DEVELOPING A PRIORITY ONE MISSION OF SOME KIND
C          OTHER THAN A SPECIAL DEPLOYMENT SAR CASE.  DETER-
C          MINE THE NUMBER OF TOTAL HOURS THE MISSION WILL
C          BE UNDERWAY AND NUMBER OF FLIGHT HOURS REQUIRED
C
      JDEN15=RT*16.0
      IF(JDEN15.LT.1) JDEN15=1
      IF(JDEN15.GT.8) GO TO 5146
      JDENT8=FLOAT(JDEN15)*0.9
      IF(JDENT8.LT.1) JDENT8=1
      GO TO 5186
 5146 JDENT8=FLOAT(JDEN15)*0.70
      GO TO 5186
 5150 IF(JDENT1.GT.2) GO TO 5162
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C
C          DEVELOPING A PRIORITY TWO MISSION.  DETERMINE NUM-
C          BER OF TOTAL HOURS MISSION WILL BE UNDERWAY AND
C          NUMBER OF FLIGHT HOURS REQUIRED
C
      DO 5154 L=1,6
      IF(RT.LE.QND2(L)) GO TO 5158
 5154 CONTINUE
 5158 JDEN15=L*12
      JDENT8=(FLOAT(JDEN15)/12.0)*8.0
      IF(JDENT8.LT.8) JDENT8=4
      GO TO 5186
C
C          DEVELOPING A PRIORITY THREE MISSION
C
 5162 ID=ID*K
      RD=0.5+FLOAT(ID)*Z
C
C          DETERMINE IF THE PRIORITY THREE MISSION WILL BE
C          UNDERWAY MORE THAN ONE DAY OR NOT.  IF NOT, CON-
C          TINUE
C
      IF(RD.LE.PTAD) GO TO 5166
C
C          PRIORITY THREE MISSION WILL BE UNDERWAY ONE DAY OR
C          LESS.  DETERMINE NUMBER OF TOTAL HOURS MISSION
C          WILL BE UNDERWAY AND NUMBER OF FLIGHT HOURS RE-
C          QUIRED
C
      JDEN15=RT*10.0
      IF(JDEN15.LT.2) JDEN15=2
      JDENT8=JDEN15
      GO TO 5186
C
C          PRIORITY THREE MISSION WILL BE UNDERWAY MORE THAN
C          ONE DAY.  DETERMINE NUMBER OF THREE DAY PERIODS IT
C          WILL BE UNDERWAY, TOTAL HOURS UNDERWAY, AND FLIGHT
C          HOURS WHICH ARE DEPENDENT ON TOTAL LENGTH OF
C          MISSION
C
 5166 DO 5170 L=1,15
      IF(RT.LE.QND3(L)) GO TO 5174
 5170 CONTINUE
 5174 JDEN15=L*72
      IF(L.LT.3) GO TO 5178
      IF(L.LT.10) GO TO 5182
      JDENT8=L*6
      GO TO 5186
 5178 JDENT8=L*15
      GO TO 5186
 5182 JDENT8=L*9
C
C          IF DEVELOPING ANY MISSION OTHER THAN A SPECIAL SAR
C          DEPLOYMENT CASE ONLY ONE C-130 IS REQUIRED.  STORE
C          THIS FACT
C
 5186 IF(JDENT7.GT.0) GO TO 5190
      JDENT7=1
C
C          IF DEVELOPING A REGULAR MISSION, TIME OF SCHEDULED
C          DEPARTURE IS CURRENT TIME STEP.  IF DEVELOPING A
C          SPECIAL MISSION, THE DEPARTURE TIME WAS DETERMINED
C          IN THE MAIN PROGRAM.  STORE THE APPROPRIATE DE-
C          PARTURE TIME
C
 5190 IF(NSPNST.GT.0) GO TO 5194
      JDENT9=NCTS
      GO TO 5198
 5194 JDENT9=NSPNST
C
C          DETERMINE THE TIME STEP IN WHICH THE MISSION IS
C          SCHEDULED TO CLOSE
```

```
C
 5198 JDEN10=JDENT9+JDEN15
C
C          DETERMINE WHETHER THE MISSION BEING DEVELOPED CAN
C          HAVE A HELICOPTER SUBSTITUTED FOR A C-130, IF
C          NECESSARY
C
      IF(JDEN15.GT.48) GO TO 5199
      IF(NDSC.EQ.1) GO TO 5199
      ID=ID*K
      RS=0.5+FLOAT(ID)*Z
      IF(RS.GT.PSUBM) GO TO 5199
      JDENT5=1
      GO TO 5200
 5199 JDENT5=0
      NDSC=0
 5200 CONTINUE
C
C          LOCATE THE FIRST EMPTY MISSION VECTOR IN THE MIS-
C          SION ACCOUNTING VECTOR ARRAY NMISSN AND LOAD THE
C          MISSION INFORMATION FOR THE MISSION JUST DEVELOP-
C          ED INTO THIS VECTOR
C
      DO 5202 I=1,100
      IF(NMISS(I).EQ.0) GO TO 5208
 5202 CONTINUE
 5208 NMISSN(I,1)=JDENT1
      NMISSN(I,2)=JDENT2
      NMISSN(I,3)=JDENT3
      NMISSN(I,4)=JDENT4
      NMISSN(I,5)=JDENT5
      NMISSN(I,6)=JDENT6
      NMISSN(I,7)=JDENT7
      NMISSN(I,8)=JDENT8
      NMISSN(I,9)=JDENT9
      NMISSN(I,10)=JDEN10
      NMISSN(I,11)=0
      NMISSN(I,12)=LF(1)
      NMISSN(I,13)=LF(2)
      NMISSN(I,14)=LF(3)
      NMISSN(I,15)=JDEN15
      NMISSN(I,16)=NM
      NUMFHR=NUMFHR+(JDENT8*JDENT7)
C
C          IF SPECIAL MISSION JUST DEVELOPED, ZERO SPECIAL
C          MISSION OCCURRENCE TIME INDICATOR AND RETURN -
C          OTHERWISE, DECREASE THE INDICATOR OF REGULAR MIS-
C          SIONS TO BE DEVELOPED AND SEE IF THERE ARE ANY
C          MORE REQUIRED
C
 5209 IF(NSPNST.GT.0) GO TO 5210
      NNSCTD=NNSCTD-1
      GO TO 5004
 5210 NSPNST=0
      RETURN
C
C          HAVE A CASE TO BE DEVELOPED.  INCREASE TOTAL CASE
C          COUNTER BY ONE AND DETERMINE PRIORITY OF THE
C          CASE AND STORE
C
 5250 IC=IC*K
      RX=0.5+FLOAT(IC)*Z
      NC=NC+1
      DO 5255 I=1,3
      IF(RX.LE.TCP(I)) GO TO 5260
 5255 CONTINUE
 5260 IDENT1=I
C
C          LOCATE THE FIRST EMPTY CASE VECTOR IN THE CASE
C          ACCOUNTING VECTOR ARRAY NCASE
C
      DO 5265 I=1,50
```

```
      IF(NCAS(I).EQ.0) GO TO 5270
 5265 CONTINUE
C
C          LOAD CASE VECTOR WITH CASE PRIORITY
C
 5270 NCAS(I)=IDENT1
      IF(IDENT1.GT.1) GO TO 5280
C
C          DEVELOPING A PRIORITY ONE CASE.  DETERMINE WHETHER
C          IT IS A CONTINUOUS ON-SCENE RELIEF CASE OR NOT
C
      IC=IC*K
      RX=0.5+FLOAT(IC)*Z
      IF(RX.GT.PCSC) GO TO 5280
      IDENT2=1
      GO TO 5285
 5280 IDENT2=0
C
C          HAVING DETERMINED WHETHER THE CASE IS A CONTINUOUS
C          ON-SCENE RELIEF CASE OR NOT (ONLY PRIORITY ONE
C          CASES CAN BE) LOAD CASE VECTOR WITH THIS INFOR-
C          MATION
C
 5285 NCASE(I,2)=IDENT2
      IC=IC*K
      RX=0.5+FLOAT(IC)*Z
C
C          DETERMINE GENERAL LOCATION THAT THE CASE IS IN:
C          FIRST/THIRD OR FIFTH/SEVENTH OR EIGHTH/COAST
C          GUARD DISTRICTS
C
      DO 5290 J=1,3
      IF(RX.LE.PCL(J)) GO TO 5295
 5290 CONTINUE
 5295 IC=IC*K
      RT=0.5+FLOAT(IC)*Z
      IC=IC*K
      RU=0.5+FLOAT(IC)*Z
      IC=IC*K
      RO=0.5+FLOAT(IC)*Z
C
C          IF CASE IS IN SEVENTH OR EIGHTH COAST GUARD DIS-
C          TRICT, DETERMINE IF IT IS IN THE GULF OF MEXICO,
C          IF NOT, CONTINUE - IF IT IS IN GULF OF MEXICO,
C          SHIFT TO DIFFERENT SECTION TO DETERMINE CASE LONG-
C          ITUDE
C
      IF(J.LT.3) GO TO 5300
      IF(RT.LE.PCGULF) GO TO 5370
C
C          CASE IS IN ATLANTIC.  DETERMINE DISTANCE FROM
C          COAST.  MAX DISTANCE = 1000 NM
C
 5300 IDENT4=10.0+(-ALON*ALOG(RO))
      IF(IDENT4.GT.1000) IDENT4=1000
C
C          IF CASE IN ATLANTIC IS LESS THAN 300 NM FROM COAST
C          DETERMINE WHETHER IT IS OF THE TYPE THAT A HELI-
C          COPTER CAN BE SUBSTITUTED FOR A C-130 OR NOT AND
C          STORE RESULT.
C
      IF(IDENT4.GT.300) GO TO 5302
      IC=IC*K
      RX=0.5+FLOAT(IC)*Z
      IF(RX.GT.PSSC) GO TO 5302
      IDENT5=1
      GO TO 5304
 5302 IDENT5=0
C
C          WITH THE CASE IN THE ATLANTIC GO TO ITS GENERAL
C          AREA IN ORDER TO DETERMINE ITS LATITUDE (NAUTICAL
C          MILES NORTH OF SIMULATED BASE LINE)
```

```
C
 5304 IF(J.EQ.3) GO TO 5340
      IF(J.EQ.2) GO TO 5320
C
C          CASE IS IN THE FIRST COAST GUARD DISTRICT.  SEE IF
C          IT IS NORTH OF MAINE
C
      IF(RT.LE.PCNN) GO TO 5305
C
C          CASE IS IN THE FIRST COAST GUARD DISTRICT AND NOT
C          NORTH OF MAINE.  DETERMINE ITS LATITUDE
C
      IDENT3=1780.0+340.0*RU
      GO TO 5390
C
C          CASE IS IN THE FIRST COAST GUARD DISTRICT NORTH OF
C          MAINE.  DETERMINE ITS LATITUDE
C
 5305 IDENT3=2120.0+(-ALATN*ALOG(RU))
      IF(IDENT3.GT.2620) IDENT3=2620
      GO TO 5390
C
C          CASE IS IN EITHER THE THIRD OR FIFTH COAST GUARD
C          DISTRICT.  DETERMINE ITS LATITUDE
C
 5320 IDENT3=1130.0+650.0*RU
      GO TO 5390
C
C          CASE IS IN THE SEVENTH COAST GUARD DISTRICT ATLAN-
C          TIC REGION.  SEE IF IT IS SOUTH OF LINE RUNNING
C          FROM CENTER OF FLORIDA THROUGH PUERTO RICO AND
C          THEN DETERMINE ITS LATITUDE CORRESPONDINGLY
C
 5340 IF(RT.LE.PCSOU) GO TO 5360
      IDENT3=710.0+420.0*RU
      GO TO 5390
 5360 IDENT3=480.0+230.0*RU
      GO TO 5390
C
C          CASE IS IN GULF OF MEXICO.  DETERMINE ITS LATITUDE
C          AND DISTANCE WEST OF SIMULATED COAST LINE
C
 5370 IDENT3=615.0*RU
      IDENT4=-10.0-(860.0*RO)
C
C          IF CASE WHICH IS IN THE GULF OF MEXICO IS WITHIN
C          300 NM OF ANY OF THE THREE COASTS, DETERMINE
C          WHETHER IT IS OF THE TYPE THAT A HELICOPTER CAN
C          BE SUBSTITUTED FOR A C-130 OR NOT AND STORE RESULT
C
      IF(IDENT3.GT.315) GO TO 5375
      IF(IDENT4.LT.-580) GO TO 5375
      IF(IDENT4.GT.-300) GO TO 5375
 5372 IDENT5=0
      GO TO 5390
 5375 IC=IC*K
      RX=0.5+FLOAT(IC)*Z
      IF(RX.GT.PSSC) GO TO 5372
      IDENT5=1
C
C          DETERMINE CLOSEST C-130 STATION TO SCENE OF CASE
C          AND STORE INFORMATION
C
 5390 DO 5395 L=1,3
      LF(L)=SQRT((FLOAT(IDENT4)**2)+(FLOAT(LAC(L)-IDENT3)
     1**2))
 5395 CONTINUE
      IF(LF(1).LE.LF(2)) GO TO 5396
      IF(LF(2).LE.LF(3)) GO TO 5397
      IDENT6=3
      GO TO 5398
 5396 IDENT6=1
```

```
      GO TO 5398
 5397 IDENT6=2
C
C          LOAD CASE VECTOR WITH LATITUDE, LONGITUDE, WHETHER
C          CONTINUOUS ON-SCENE RELIEF TYPE OR NOT, CLOSEST
C          C-130 STATION, AND DISTANCES FROM EACH OF THE
C          THREE C-130 STATIONS
C
 5398 NCASE(I,3)=IDENT3
      NCASE(I,4)=IDENT4
      NCASE(I,5)=IDENT5
      NCASE(I,6)=IDENT6
      NCASE(I,12)=LF(1)
      NCASE(I,13)=LF(2)
      NCASE(I,14)=LF(3)
C
C          IF CASE IS A CONTINUOUS ON-SCENE RELIEF TYPE,
C          SHIFT TO INDICATE THE NUMBER OF C-130S REQUIRED
C          IS ONE
C
      IF(IDENT2.EQ.1) GO TO 5470
      IC=IC*K
      RP=0.5+FLOAT(IC)*Z
      IF(IDENT1.EQ.3) GO TO 5460
      IF(IDENT1.EQ.2) GO TO 5450
C
C          DEVELOPING A PRIORITY ONE, NON-CONTINUOUS ON-SCENE
C          RELIEF CASE - DETERMINE NUMBER OF C-130S REQUIRED
C
      DO 5440 L=1,4
      IF(RP.LE.CDFA(L)) GO TO 5445
 5440 CONTINUE
 5445 IDENT7=L
      GO TO 5490
C
C          DEVELOPING A PRIORITY THREE CASE - DETERMINE NUM-
C          BER OF C-130S REQUIRED
C
 5450 DO 5455 L=1,3
      IF(RP.LE.CDFB(L)) GO TO 5458
 5455 CONTINUE
 5458 IDENT7=L
      GO TO 5490
C
C          DEVELOPING A PRIORITY THREE CASE - DETERMINE
C          WHETHER IT REQUIRES ONE OR TWO C-130S
C
 5460 IF(RP.LE.CDFC) GO TO 5470
       IDENT7=2
      GO TO 5490
C
C          DEVELOPING EITHER A PRIORITY THREE CASE REQUIRING
C          ONE C-130 OR A CONTINUOUS ON-SCENE RELIEF CASE.
C          INITIALIZE INDICATOR TO SHOW ONLY ONE C-130 RE-
C          QUIRED
C
 5470 IDENT7=1
C
C          LOAD CASE VECTOR WITH NUMBER OF C-130S REQUIRED
C          FOR CASE BEING DEVELOPED
C
 5490 NCASE(I,7)=IDENT7
      IC=IC*K
      RT=0.5+FLOAT(IC)*Z
      IF(IDENT2.EQ.0) GO TO 5510
C
C          DEVELOPING A CONTINUOUS ON-SCENE RELIEF CASE.  DE-
C          TERMINE NUMBER OF ON-SCENE HOURS REQUIRED, NOTE
C          THE INITIAL DEPARTURE TIME AS DURING THE CURRENT
C          TIME STEP AND DETERMINE THE TIME STEP IN WHICH THE
C          CASE CLOSES
C
```

```
      IDENT8=RT*24.0
      IF(IDENT8.LT.2) IDENT8=2
      IDENT9=NCTS
      IDEN15=IDENT8+IDENT9
      GO TO 5596
C
C          DEVELOPING A NON-CONTINUOUS ON-SCENE RELIEF TYPE
C          CASE.  DETERMINE EARLIEST POSSIBLE TIME OF DAY
C          THAT A C-130 CAN ARRIVE ON-SCENE
C
 5510 TTS=FLOAT(LF(IDENT6))/290.0
      NTTS=TTS
      NTPOS=NDAYTI+NTTS
      IF(NTPOS.GT.24) NTPOS=NTPOS-24
C
C          DETERMINE, BY CASE PRIORITY, THE NUMBER OF WHOLE
C          AND PART DAYS THE CASE WILL BE UNDERWAY
C
      IF(IDENT1.GT.2) GO TO 5530
      IF(IDENT1.GT.1) GO TO 5520
      F8=RT*4.0
      GO TO 5540
 5520 F8=RT*3.0
      GO TO 5540
 5530 F8=RT*2.0
C
C          DETERMINE MAXIMUM NUMBER OF HOURS IN ONE DAY THAT
C          A C-130 COULD BE ON-SCENE WITH A MAXIMUM OF TEN
C          FLIGHT HOURS AVAILABLE PER DAY
C
 5540 FF8=10.0-(2*TTS)
C
C          DETERMINE INITIAL TOTAL HOURS ON-SCENE PER AIR-
C          CRAFT REQUIRED FOR THE CASE.  MINIMUM IS TWO HOURS
C
      IDENT8=F8*FF8
 5548 IF(IDENT8.LT.2) IDENT8=2
C
C          ZERO FIRST DAY ON-SCENE TIME CAPABILITY INDICATOR
C          AND DETERMINE INTEGER COMPUTATION FACTORS OF HOURS
C          ON-SCENE PER AIRCRAFT FOR CASE CLOSURE TIME DE-
C          TERMINATION
C
      NTOSC=0
      KF8=F8
      REM=F8-KF8
      KCOR=(REM*FF8)+TTS
      IF(NTPOS.GT.16) GO TO 5550
      IF(NTPOS.LE.6) GO TO 5560
C
C          EARLIEST TIME POSSIBLE FOR C-130 TO GET ON-SCENE
C          IS BETWEEN 0600 AND 1600.  DETERMINE TOTAL ON-
C          SCENE HOURS REQUIRED USING NUMBER OF HOURS FIRST
C          DAY PLUS NUMBER OF DAYS FOR CASE DETERMINED
C          EARLIER. INITIALIZE INDICATOR TO SHOW THAT TAKE
C          OFF FOR CASE IS TO BE DURING CURRENT TIME STEP
C
      NTOSC=18-NTPOS
      IF(NTOSC.GT.FF8) NTOSC=FF8
      IDENT8=(IDENT8+NTOSC)*IDENT7
      IDENT9=NCTS
      GO TO 5590
C
C          EARLIEST POSSIBLE TIME FOR C-130 ON-SCENE IS AFTER
C          1600 SO DELAY TAKE OFF UNTIL 0600 NEXT MORNING.
C          COMPUTE TOTAL ON-SCENE HOURS REQUIRED WITHOUT ANY
C          CORRECTION
C
 5550 IDENT8=IDENT8*IDENT7
      NTSTG=30-NDAYTI
      IDENT9=NCTS+NTSTG
      GO TO 5590
```

```
C
C          EARLIEST POSSIBLE TIME FOR C-130 ON-SCENE IS BE-
C          FORE 0600 SO DELAY TAKE OFF UNTIL 0600.  COMPUTE
C          TOTAL ON-SCENE HOURS REQUIRED WITHOUT ANY CORRECT-
C          ION
C
 5560 IDENT8=IDENT8*IDENT7
      IF(NDAYTI.GT.6) GO TO 5570
      NTSTG=6-NDAYTI
      GO TO 5580
 5570 NTSTG=30-NDAYTI
 5580 IDENT9=NCTS+NTSTG
C
C          DETERMINE TIME STEP IN WHICH CASE IS TO CLOSE CON-
C          SIDERING CORRECTIONS FOR PARTIAL DAYS ACTION, ETC.
C
 5590 IF(NTOSC.EQ.0) GO TO 5594
      IDEN15=IDENT9+(30-NDAYTI)+(KF8*24)+KCOR
      GO TO 5596
 5594 IDEN15=IDENT9+(KF8*24)+KCOR
C
C          LOAD CASE VECTOR WITH TOTAL HOURS ON-SCENE, FIRST
C          C-130 DEPARTURE TIME, CASE CLOSE TIME, AND CASE
C          NUMBER
C
 5596 NCASE(I,8)=IDENT8
      NCASE(I,9)=IDENT9
      NCASE(I,10)=1
      NCASE(I,15)=IDEN15
      NCASE(I,16)=NC
C
C          ADJUST TALLY OF TOTAL CASE ON-SCENE HOURS REQUIRED
C
      NUSFHR=NUSFHR+IDENT8
C
C          ADJUST COUNTER OF CASES TO BE DETERMINED AND GO TO
C          DETERMINE IF THERE ARE MORE CASES OR MISSIONS TO
C          BE DEVELOPED THIS TIME STEP
C
      NSCTD=NSCTD-1
      GO TO 5000
      END
```

```
C*********************************************************************
C****                                                             ****
C****                      SUBROUTINE SUB                         ****
C****                                                             ****
C*********************************************************************
C
C
C          THE KEY CALLING PARAMETERS FOR SUBROUTINE SUB ARE
C          THE C-130 STATION AREA REQUIRING A SUBSTITUTION
C          (NAREA) AND NTYPE WHICH INDICATES IF A CASE OR
C          CASES AND POSSIBLY MISSIONS WITHIN THAT AREA ARE
C          PROSPECTIVELY SUBSTITUTABLE (1) OR IF THERE ARE NO
C          SUBSTITUTABLE CASES IN THE AREA BUT THERE IS AT
C          LEAST ONE PROSPECTIVELY SUBSTITUTABLE MISSION IN
C          THE AREA (2)
C
C          THE FUNCTION OF SUBROUTINE SUB IS TO IDENTIFY ALL
C          PROSPECTIVE SUBSTITUTABLE CASES AND MISSIONS IN
C          THE SUBJECT AREA AND ATTEMPT TO SUBSTITUTE HELI-
C          COPTERS FOR C-130S ON THESE CASES AND MISSIONS
C          WITH HH-3FS BEING PREFERABLE TO HH-52AS.  THE
C          ORDER OF ATTEMPTED SUBSTITUTION IS CASES FIRST
C          FOLLOWED BY MISSIONS AND FROM LOWEST TO HIGHEST
C          PRIORITY WITHIN EACH CLASS.  SUBSTITUTION ATTEMPTS
C          ARE CONTINUED UNTIL A) THE C-130S AVAILABLE ARE
C          SUFFICIENT TO MEET THE REMAINING REQUIREMENTS FOR
C          THE CURRENT TIME STEP OR B) THERE ARE NO FURTHER
C          SUBSTITUTIONS POSSIBLE; WHICHEVER OCCURS FIRST.
C
C
      DIMENSION NCSUB(5,3),NMSUB(5,3)
      COMMON/INFO1/TCP(3),PCL(3),PCSC,PSCI,PSSC,PCSCU,PCNN,
     1PCGULF,Z,CDFA(4),CDFB(3),CDFC,PRI(3),PHOLD1,PHOLD2,
     2PSC,PPSC(3),PHOLD,PMEDIC,PMSC(3),PPUP(11),PSUBM,
     3QND1(4),QND2(6),QND3(15),PTAD,TSPDF(5),ALON,ALATN
      COMMON/INFO2/IC,NSCTD,NCASE(50,17),NCTS,K,LAC(3),
     1NDAYTI,NM,ID,LOC(9),NSPNST,NNSCTD,NMISSN(100,16),NC
      COMMON/INFO3/NTYPE,NAREA,NSNA,NSCA,NSSA,NSTA(25,12),
     1NHACT(20,6),NTPR,NPRT(3),NTPA,NMISA(20,3),
     2NCASA(10,3),IF,NPA(3)
      COMMON/INFO4/NRTN,NISSN,NACE,NPANE,NPLANE(15,16)
      COMMON/INFO5/IE,NAREAS,NPLUSE,NPIS
      COMMON/INFO6/JPRI,JDEC,NCLOSE
      COMMON/INFO7/DIST,DISTR,XHRST
C
C          ZERO ACCOUNTING VECTORS FOR PROSPECTIVE SUBSTITUT-
C          ABLE CASES AND MISSIONS
C
      DO 5010 I=1,5
      DO 5000 J=1,3
      NCSUB(I,J)=0
      NMSUB(I,J)=0
 5000 CONTINUE
 5010 CONTINUE
C
C          INITIALIZE PROSPECTIVE SUBSTITUTABLE CASE COUNTER
C          TO ZERO.  IF NO SUBSTITUTABLE CASES IN SUBJECT
C          AREA FOR THIS TIME STEP GO DIRECTLY TO FINDING
C          PROSPECTIVE SUBSTITUTABLE MISSIONS
C
      LC=0
      IF(NTYPE.EQ.2) GO TO 5080
C
C          FIND CASES IN SUBJECT AREA REQUIRING ACTION DURING
C          CURRENT TIME STEP THAT MAY BE SUBSTITUTABLE AND
C          LOAD PROSPECTIVE SUBSTITUTABLE CASE ACCOUNTING
C          VECTORS
C
```

```
      JJ=1
      DO 5050 I=1,10
      IF(NCASA(I,3).EQ.0) GO TO 5060
      IF(NCASA(I,3).EQ.NAREA) GO TO 5020
      GO TO 5050
 5020 IF(NCASE(NCASA(I,1),5).EQ.1) GO TO 5030
      GO TO 5050
 5030 DO 5040 L=1,2
      NCSUB(JJ,L)=NCASA(I,L)
 5040 CONTINUE
      JJ=JJ+1
      IF(JJ.LT.6) GO TO 5050
      GO TO 5060
 5050 CONTINUE
C
C         DETERMINE TOTAL NUMBER OF PROSPECTIVE SUBSTITUT-
C         ABLE CASES IN SUBJECT AREA REQUIRING ACTION DURING
C         CURRENT TIME STEP
C
 5060 DO 5070 M=1,5
      IF(NCSUB(M,1).EQ.0) GO TO 5080
      LC=LC+1
 5070 CONTINUE
C
C         FIND MISSIONS IN SUBJECT AREA REQUIRING ACTION
C         DURING CURRENT TIME STEP THAT MAY BE SUBSTITUTABLE
C         AND LOAD PROSPECTIVE SUBSTITUTABLE MISSION
C         ACCOUNTING VECTORS
C
 5080 JJ=1
      DO 5115 I=1,20
      IF(NMISA(I,3).EQ.0) GO TO 5120
      IF(NMISA(I,3).EQ.NAREA) GO TO 5090
      GO TO 5115
 5090 IF(NMISSN(NMISA(I,1),5).EQ.1) GO TO 5100
      GO TO 5115
 5100 DO 5110 L=1,2
      NMSUB(JJ,L)=NMISA(I,L)
 5110 CONTINUE
      JJ=JJ+1
      IF(JJ.LT.6) GO TO 5115
      GO TO 5120
 5115 CONTINUE
C
C         DETERMINE TOTAL NUMBER OF PROSPECTIVE SUBSTITUT-
C         ABLE MISSIONS IN SUBJECT AREA REQUIRING ACTION
C         DURING CURRENT TIME STEP
C
 5120 LM=0
      DO 5130 M=1,5
      IF(NMSUB(M,1).EQ.0) GO TO 5140
      LM=LM+1
 5130 CONTINUE
C
C         IF THERE ARE NO PROSPECTIVE SUBSTITUTABLE CASES GO
C         DIRECTLY TO HANDLING MISSIONS
C
 5140 IF(LC.EQ.0) GO TO 5160
 5150 CONTINUE
C
C         RECORD POSITION OF PROSPECTIVE SUBSTITUTABLE CASE
C         OF LOWEST PRIORITY WHICH HAS NOT BEEN EXAMINED
C         BEFORE
C
 5152 LATC=NCASE(NCSUB(LC,1),3)
      LONGC=NCASE(NCSUB(LC,1),4)
C
C         SET CASE SUBSTITUTION INDICATOR AND SHIFT TO DE-
C         TERMINE IF CASE IS WITHIN RANGE OF HELICOPTER
C         STATION AND IF HELICOPTER AVAILABLE
C
      NTYSUB=1
```

```
      GO TO 5170
 5160 CONTINUE
C
C          IF THERE ARE NOT ANYMORE PROSPECTIVE SUBSTITUT-
C          ABLE MISSIONS THEN RETURN - OTHERWISE RECORD
C          POSITION OF PROSPECTIVE SUBSTITUTABLE MISSION OF
C          LOWEST PRIORITY WHICH HAS NOT BEEN EXAMINED YET
C          AND SET MISSION SUBSTITUTION INDICATOR
C
      IF(LM.EQ.0) GO TO 5710
      LATC=NMISSN(NMSUB(LM,1),3)
      LONGC=NMISSN(NMSUB(LM,1),4)
      NTYSUB=2
C
C          DETERMINE PROPER HELICOPTER STATIONS TO INVESTI-
C          GATE FOR POSSIBLE SUBSTITUTION ON SUBJECT CASE OR
C          MISSION
C
 5170 IF(NAREA.EQ.1) GO TO 5180
      IF(NAREA.EQ.2) GO TO 5190
      II=NSNA+NSCA+1
      III=NSNA+NSCA+NSSA
      GO TO 5200
 5180 II=1
      III=NSNA
      GO TO 5200
 5190 II=NSNA+1
      III=NSNA+NSCA
C
C          BEGIN INVESTIGATION OF PROPER HELICOPTER STATIONS
C          TO DETERMINE STATIONS WITHIN RANGE, IF ANY
C
 5200 DO 5680 L=II,III
C
C          IF LATITUDE OF CASE OR MISSION IS MORE THAN 300 NM
C          NORTH OF SUBJECT STATION TRY NEXT STATION NORTH
C
      IF(LATC.GT.NSTA(L,1)+300) GO TO 5680
C
C          IF LATITUDE OF CASE OR MISSION IS MORE THAN 300 NM
C          SOUTH OF SUBJECT STATION THEN IT IS NOT WITHIN
C          RANGE SO TRANSFER TO NOTE THAT IT IS NOT SUB-
C          STITUTABLE
C
      IF(LATC.LT.NSTA(L,1)-300) GO TO 5690
C
C          CASE OR MISSION IS WITHIN 300 NM LATITUDE OF SUB-
C          JECT STATION SO FIND ACTUAL DISTANCE FROM STATION
C          IF DISTANCE IS GREATER THAN 300NM, TRY NEXT
C          STATION NORTH
C
      DIST=SQRT((FLOAT(LATC-NSTA(L,1))**2)+(FLOAT(LONGC-
     1NSTA(L,2))**2))
      IF(DIST.GT.300) GO TO 5680
C
C          IF STATION DOES NOT HAVE HH-3FS SEE IF SUBSTITU-
C          TION CAN BE MADE WITH HH-52(S)
C
      IF(NSTA(L,3).EQ.0) GO TO 5430
 5210 IF=IF*K
      RX=0.5+FLOAT(IF)*Z
C
C          DETERMINE IF HH-3F IS AVAILABLE AT STATION, IF
C          NOT, TRY TO MAKE SUBSTITUTION WITH HH-52AS
C
      IF(RX.GT.(NSTA(L,8))*.01) GO TO 5430
C
C          DETERMINE TIME HH-3F WILL HAVE AVAILABLE ON-SCENE
C
      TTS=DIST/125.0
      NTOS=(5.5-(2*TTS))+0.5
      IF(NTOS.LE.0) NTOS=1
```

```
C
C          LOAD HELICOPTER ACTIVITY VECTOR
C
      DO 5220 M=1,20
      IF(NHACT(M,1).EQ.0) GO TO 5230
 5220 CONTINUE
 5230 NHACT(M,1)=3
      NHACT(M,2)=L
      IF(NTYSUB.EQ.2) GO TO 5240
      NHACT(M,3)=NCTS+5
      NHACT(M,4)=NCASE(NCSUB(LC,1),16)
      NHACT(M,5)=0
      NHACT(M,6)=NCTS+TTS+0.25+NTOS
      GO TO 5250
 5240 NHACT(M,4)=0
      NHACT(M,5)=NMISSN(NMSUB(LM,1),16)
      NHACT(M,3)=NMISSN(NMSUB(LM,1),15)+NCTS
      NHACT(M,6)=NMISSN(NMSUB(LM,1),10)
C
C          ADJUST HELICOPTER STATION VECTOR FOR HH-3F ON
C          C-130 CASES AND HH-3F AVAILABILITY
C
 5250 NSTA(L,6)=NSTA(L,6)+1
      IF(NSTA(L,3).GT.3) GO TO 5270
      IF(NSTA(L,6).GT.1) GO TO 5260
      NSTA(L,8)=5
      GO TO 5290
 5260 NSTA(L,8)=0
       GO TO 5290
 5270 IF(NSTA(L,6).GT.1) GO TO 5280
      NSTA(L,8)=10
      GO TO 5290
 5280 NSTA(L,8)=0
 5290 IF(NTYSUB.EQ.2) GO TO 5360
C
C          IF SUBSTITUTING ON A CASE, ADJUST SUBJECT CASE
C          VECTOR, NUMBER OF PLANES REQUIRED IN SUBJECT AREA
C          AND TOTAL FOR CURRENT TIME STEP
C
      NCASE(NCSUB(LC,1),11)=NCASE(NCSUB(LC,1),11)+1
      NCASE(NCSUB(LC,1),8)=NCASE(NCSUB(LC,1),8)-NTOS
      IF(NCASE(NCSUB(LC,1),8).LT.0) NCASE(NCSUB(LC,1),8)=0
      NPRT(NAREA)=NPRT(NAREA)-1
      IF(NCASE(NCSUB(LC,1),7).GT.NCASE(NCSUB(LC,1),11)) GO
     1TO 5293
      NCASE(NCSUB(LC,1),9)=NCTS-NDAYTI+30
 5293 NTPR=NTPR-1
      IF(NCASE(NCSUB(LC,1),7).GT.NCASE(NCSUB(LC,1),11)) GO
     1TO 5300
C
C          IF SUBJECT CASE DOES NOT REQUIRE ANY FURTHER
C          ACTION DURING CURRENT TIME STEP REMOVE ITS ACTION
C          VECTOR
C
      GO TO 5310
C
C          IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C          REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE
C          ATTEMPT TO SUBSTITUTE ANOTHER HELICOPTER ON SUB-
C          JECT CASE
C
 5300 IF(NTPA.GE.NTPR) GO TO 5710
      GO TO 5210
C
C          NO FURTHER ACTION REQUIRED ON SUBJECT CASE THIS
C          TIME STEP SO ZERO ITS ACTION VECTOR
C
 5310 DO 5320 J=1,10
      IF(NCASA(J,1).EQ.NCSUB(LC,1)) GO TO 5330
 5320 CONTINUE
 5330 DO 5340 I=J,10
      IF(NCASA(I+1,1).EQ.0) GO TO 5342
```

```
      NCASA(I,1)=NCASA(I+1,1)
      NCASA(I,2)=NCASA(I+1,2)
      NCASA(I,3)=NCASA(I+1,3)
 5340 CONTINUE
 5342 DO 5344 M=1,3
      NCASA(I,M)=0
 5344 CONTINUE
C
C          IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C          REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE SEE
C          IF THERE IS ANOTHER PROSPECTIVE SUBSTITUTABLE CASE
C          TO TRY, IF SO, TRY IT, IF NOT GO TO CHECK PROSPEC-
C          TIVE SUBSTITUTABLE MISSIONS
C
 5350 IF(NTPA.GE.NTPR) GO TO 5710
      LC=LC-1
      IF(LC.EQ.0) GO TO 5160
      GO TO 5150
C
C          IF SUBSTITUTING ON A MISSION, ADJUST SUBJECT
C          MISSION VECTOR, NUMBER OF PLANES REQUIRED IN SUB-
C          JECT AREA AND TOTAL FOR CURRENT TIME STEP
C
 5360 NMISSN(NMSUB(LM,1),11)=NMISSN(NMSUB(LM,1),11)+1
      NPRT(NAREA)=NPRT(NAREA)-1
      NTPR=NTPR-1
      IF(NMISSN(NMSUB(LM,1),7).GT.NMISSN(NMSUB(LM,1),11))
     1GO TO 5370
C
C          IF SUBJECT MISSION DOES NOT REQUIRE ANY FURTHER
C          ACTION DURING CURRENT TIME STEP REMOVE ITS ACTION
C          VECTOR
C
      GO TO 5380
C
C          IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C          REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE
C          ATTEMPT TO SUBSTITUTE ANOTHER HELICOPTER ON SUB-
C          JECT MISSION
C
 5370 IF(NTPA.GE.NTPR) GO TO 5710
      GO TO 5210
C
C          NO FURTHER ACTION REQUIRED ON SUBJECT MISSION THIS
C          TIME STEP SO ZERO ITS ACTION VECTOR
C
 5380 DO 5390 J=1,20
      IF(NMISA(J,1).EQ.NMSUB(LM,1)) GO TO 5400
 5390 CONTINUE
 5400 DO 5410 I=J,20
      IF(NMISA(I+1,1).EQ.0) GO TO 5412
      NMISA(I,1)=NMISA(I+1,1)
      NMISA(I,2)=NMISA(I+1,2)
      NMISA(I,3)=NMISA(I+1,3)
 5410 CONTINUE
 5412 DO 5414 M=1,3
      NMISA(I,M)=0
 5414 CONTINUE
C
C          IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C          REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE SEE
C          IF THERE IS ANOTHER PROSPECTIVE SUBSTITUTABLE
C          MISSION TO TRY, IF SO, TRY IT, IF NOT, RETURN
C
 5420 IF(NTPA.GE.NTPR) GO TO 5710
      LM=LM-1
      IF(LM.EQ.0) GO TO 5710
      GO TO 5160
C
C          IF MISSION OR CASE IS WITHIN 150 NM OF SUBJECT
C          STATION ATTEMPT TO SUBSTITUTE WITH HH-52AS - IF
C          NOT, TRY NEXT CASE OR MISSION
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C
 5430 IF(DIST.LE.150) GO TO 5440
      GO TO 5672
C
C         IF SUBJECT STATION DOES NOT HAVE HH-52AS TRY TO
C         SUBSTITUTE ON ANOTHER CASE OR MISSION
C
 5440 IF(NSTA(L,4).EQ.0) GO TO 5672
      IF=IF*K
      RX=0.5+FLOAT(IF)*Z
C
C         IF HH-52A NOT AVAILABLE TRY TO SUBSTITUTE ON
C         ANOTHER CASE OR MISSION
C
      IF(RX.GT.(NSTA(L,11))*0.01) GO TO 5672
      IF(NTYSUB.EQ.2) GO TO 5480
      TTS=DIST/90.0
      NTCS=(3.5-(2*TTS))+0.5
      IF(NTOS.LE.0) NTOS=1
      IF(NCASE(NCSUB(LC,1),11).GT.0) GO TO 5480
C
C         IF CASE WITHOUT ANOTHER PLANE ON SCENE AND TWO
C         HH-52AS ARE NOT AVAILABLE TRY TO SUBSTITUTE ON
C         ANOTHER CASE OR MISSION
C
      IF(RX.GT.(NSTA(L,12))*0.01) GO TO 5672
C
C         ADJUST HELICOPTER STATION VECTOR AND LOAD HELI-
C         COPTER ACTIVITY VECTOR FOR TWO HH-52AS SUBSTITUT-
C         ING ON CASE
C
      NSTA(L,9)=NSTA(L,9)+2
      NSTA(L,11)=0
      NSTA(L,12)=0
      DO 5450 M=1,20
      IF(NHACT(M,1).EQ.0) GO TO 5460
 5450 CONTINUE
 5460 NHACT(M,1)=5
      NHACT(M,2)=L
      NHACT(M,3)=NCTS+3
      NHACT(M,4)=NCASE(NCSUB(LC,1),16)
      NHACT(M,6)=NCTS+TTS+0.25+NTOS
      DO 5470 MM=1,6
      NHACT(M+1,MM)=NHACT(M,MM)
 5470 CONTINUE
C
C         ADJUST SUBJECT CASE VECTOR REFLECTING ONLY ONE
C         PLANE ADDED TO CASE
C
      NCASE(NCSUB(LC,1),11)=NCASE(NCSUB(LC,1),11)+1
      NCASE(NCSUB(LC,1),8)=NCASE(NCSUB(LC,1),8)-(NTCS*2)
      IF(NCASE(NCSUB(LC,1),8).LT.0) NCASE(NCSUB(LC,1),8)=0
      GO TO 5540
C
C         ADJUST HELICOPTER STATION VECTOR FOR ONE HH-52A
C         BEING SUBSTITUTED ON CASE OR MISSION
C
 5480 NSTA(L,9)=NSTA(L,9)+1
      IF(NSTA(L,4).GT.3) GO TO 5500
      IF(NSTA(L,9).GT.1) GO TO 5490
      NSTA(L,11)=5
      NSTA(L,12)=0
      GO TO 5510
 5490 NSTA(L,11)=0
      NSTA(L,12)=0
      GO TO 5510
 5500 IF(NSTA(L,9).GT.1) GO TO 5490
      NSTA(L,11)=10
      NSTA(L,12)=0
C
C         LOAD HELICOPTER ACTIVITY VECTOR FOR ONE HH-52A
C         BEING SUBSTITUTED ON CASE OR MISSION
```

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C
 5510 DO 5520 M=1,20
      IF(NHACT(M,1).EQ.0) GO TO 5530
 5520 CONTINUE
 5530 NHACT(M,1)=5
      NHACT(M,2)=L
      IF(NTYSUB.EQ.2) GO TO 5610
      NHACT(M,3)=NCTS+3
      NHACT(M,4)=NCASE(NCSUB(LC,1),16)
      NHACT(M,6)=NCTS+TTS+0.25+NTOS
C
C         IF SUBSTITUTING ON CASE ADJUST SUBJECT CASE VECTOR
C
      NCASE(NCSUB(LC,1),11)=NCASE(NCSUB(LC,1),11)+1
      NCASE(NCSUB(LC,1),8)=NCASE(NCSUB(LC,1),8)-NTCS
      IF(NCASE(NCSUB(LC,1),8).LT.0) NCASE(NCSUB(LC,1),8)=0
C
C         UPDATE PLANES REQUIRED IN SUBJECT AREA AND TOTAL
C         FOR CURRENT TIME STEP
C
 5540 NPRT(NAREA)=NPRT(NAREA)-1
      IF(NCASE(NCSUB(LC,1),7).GT.NCASE(NCSUB(LC,1),11)) GO
     1TO 5543
      NCASE(NCSUB(LC,1),9)=NCTS+30-NDAYTI
 5543 NTPR=NTPR-1
      IF(NCASE(NCSUB(LC,1),7).GT.NCASE(NCSUB(LC,1),11)) GO
     1TO 5550
C
C         IF SUBJECT CASE DOES NOT REQUIRE ANY FURTHER
C         ACTION DURING CURRENT TIME STEP REMOVE ITS ACTION
C         VECTOR
C
      GO TO 5560
C
C         IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C         REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE
C         ATTEMPT TO SUBSTITUTE ANOTHER HELICOPTER ON SUB-
C         JECT CASE
C
 5550 IF(NTPA.GE.NTPR) GO TO 5710
      GO TO 5440
C
C         NO FURTHER ACTION REQUIRED ON SUBJECT CASE THIS
C         TIME STEP SO ZERO ITS ACTION VECTOR
C
 5560 DO 5570 J=1,10
      IF(NCASA(J,1).EQ.NCSUB(LC,1)) GO TO 5580
 5570 CONTINUE
 5580 DO 5590 I=J,10
      IF(NCASA(I+1,1).EQ.0) GO TO 5594
      DO 5585 M=1,3
      NCASA(I,M)=NCASA(I+1,M)
 5585 CONTINUE
 5590 CONTINUE
 5594 DO 5598 M=1,3
      NCASA(I,M)=0
C
C         IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C         REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE SEE
C         IF THERE IS ANOTHER PROSPECTIVE SUBSTITUTABLE CASE
C         TO TRY, IF SO, TRY IT, IF NOT GO TO CHECK ON PRO-
C         SPECTIVE SUBSTITUTABLE MISSIONS
C
 5598 CONTINUE
 5600 IF(NTPA.GE.NTPR) GO TO 5710
      LC=LC-1
      IF(LC.EQ.0) GO TO 5160
      GO TO 5150
C
C         CONTINUE LOADING HELICOPTER ACTIVITY VECTOR FOR
C         HH-52A BEING SUBSTITUTED ON MISSION, UPDATE SUB-
C         JECT MISSION VECTOR, PLANES REQUIRED IN SUBJECT
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```
C          AREA AND TOTAL FOR CURRENT TIME STEP
C
 5610 NHACT(M,3)=NMISSN(NMSUB(LM,1),15)+NCTS
      NHACT(M,5)=NMISSN(NMSUB(LM,1),16)
      NHACT(M,6)=NMISSN(NMSUB(LM,1),10)
      NMISSN(NMSUB(LM,1),11)=NMISSN(NMSUB(LM,1),11)+1
      NPRT(NAREA)=NPRT(NAREA)-1
      NTPR=NTPR-1
      IF(NMISSN(NMSUB(LM,1),7).GT.NMISSN(NMSUB(LM,1),11))
     1GO TO 5620
C
C          IF SUBJECT MISSION DOES NOT REQUIRE ANY FURTHER
C          ACTION DURING CURRENT TIME STEP REMOVE ITS ACTION
C          VECTOR
C
      GO TO 5630
C
C          IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C          REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE
C          ATTEMPT TO SUBSTITUTE ANOTHER HELICOPTER ON SUB-
C          JECT MISSION
C
 5620 IF(NTPA.GE.NTPR) GO TO 5710
      GO TO 5440
C
C          NO FURTHER ACTION REQUIRED ON SUBJECT MISSION THIS
C          TIME STEP SO ZERO ITS ACTION VECTOR
C
 5630 DO 5640 J=1,20
      IF(NMISA(J,1).EQ.NMSUB(LM,1)) GO TO 5650
 5640 CONTINUE
 5650 DO 5660 I=J,20
      IF(NMISA(I+1,1).EQ.0) GO TO 5664
      DO 5655 M=1,3
      NMISA(I,M)=NMISA(I+1,M)
 5655 CONTINUE
 5660 CONTINUE
 5664 DO 5668 M=1,3
      NMISA(I,M)=0
 5668 CONTINUE
C
C          IF ENOUGH C-130S ARE AVAILABLE TO COVER REMAINING
C          REQUIREMENTS THIS TIME STEP RETURN - OTHERWISE SEE
C          IF THERE IS ANOTHER PROSPECTIVE SUBSTITUTABLE
C          MISSION, IF SO, TRY IT, IF NOT, RETURN
C
 5670 IF(NTPA.GE.NTPR) GO TO 5710
      LM=LM-1
      IF(LM.EQ.0) GO TO 5710
      GO TO 5160
C
C          IF WORKING ON MISSION SEE IF THERE IS ANOTHER SUB-
C          STITUTABLE MISSION, IF SO, TRY IT, IF NOT RETURN -
C          IF WORKING ON CASE SEE IF THERE IS ANOTHER SUB-
C          STITUTABLE CASE, IF SO, TRY IT, IF NOT TRY FOR
C          SUBSTITUTABLE MISSIONS
C
 5672 IF(NTYSUB.EQ.2) GO TO 5674
      LC=LC-1
      IF(LC.EQ.0) GO TO 5160
      GO TO 5150
 5674 LM=LM-1
      IF(LM.EQ.0) GO TO 5710
      GO TO 5160
 5680 CONTINUE
C
C          MISSION OR CASE BEING EXAMINED IS NOT WITHIN RANGE
C          OF ANY HELICOPTER STATION SO CHANGE ITS MISSION
C          OR CASE VECTOR TO SHOW IT IS NOT SUBSTITUTABLE AND
C          THEN TRY ANY FURTHER PROSPECTIVE SUBSTITUTIONS IF
C          ANY EXIST.  IF NOT, RETURN
C
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```
5690 IF(NTYSUB.EQ.2) GO TO 5700
     NCASE(NCSUB(LC,1),5)=0
     LC=LC-1
     IF(LC.EQ.0) GO TO 5160
     GO TO 5150
5700 NMISSN(NMSUB(LM,1),5)=0
     LM=LM-1
     IF(LM.EQ.0) GO TO 5710
     GO TO 5160
5710 CONTINUE
     RETURN
     END
```

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C*************************************************************
C****                                                     ****
C****                    SUBROUTINE FILL                  ****
C****                                                     ****
C*************************************************************
C
C
C         THE KEY CALLING PARAMETERS FOR SUBROUTINE FILL IN-
C         DICATE THE C-130 TO BE UTILIZED (NPANE) AND THE
C         TYPE OF ACTION TO BE TAKEN AS FOLLOWS:  NACE>0 IN-
C         DICATES THE C-130 IS TO BE ASSIGNED TO A SAR CASE;
C         NISSN>0 INDICATES THE C-130 IS TO BE ASSIGNED TO A
C         MISSION; AND NRTN>0 INDICATES THE C-130 IS TO BE
C         RETURNED TO ITS HOME STATION FROM ONE OF THE OTHER
C         C-130 STATIONS.  ONLY ONE OF THESE INDICATORS MAY
C         BE GREATER THAN ZERO ON ANY ONE PARTICULAR VISIT
C         TO SUBROUTINE FILL
C
C         THE FUNCTION OF SUBROUTINE FILL IS TO MAKE THE IN-
C         DICATED USAGE OF THE SPECIFIED C-130.  THE VALUE
C         OF NACE OR NISSN INDICATES THE PARTICULAR CASE OR
C         MISSION TO BE ACTED ON UNLESS THE PLANE IS SIMPLY
C         BEING RETURNED TO ITS HOME STATION.  IF THE C-130
C         IS ON ANOTHER CASE THE SUBROUTINE DIVERTS IT TO
C         THE NEW CASE.  IF THE C-130 CAN NOT GET TO THE
C         CASE WITH AT LEAST ONE HOUR ON-SCENE THE SUBROU-
C         TINE SENDS IT TO THE C-130 STATION CLOSEST TO THE
C         SCENE FOR FUEL.  IN ANY SITUATION WHERE EXTRA FLY-
C         ING HOURS ARE INVOLVED BECAUSE A C-130 IS NOT
C         AVAILABLE AT THE CLOSEST C-130 STATION OR MUST RE-
C         TURN TO ITS HOME STATION THE SUBROUTINE DETERMINES
C         AND TALLIES THE EXTRA FLYING HOURS INVOLVED.  IN
C         ALL SITUATIONS THE APPROPRIATE C-130, MISSION AND
C         CASE VECTORS ARE ADJUSTED TO REFLECT THE ACTION
C         TAKEN.
C
C
      COMMON/INFO2/IC,NSCTD,NCASE(50,17),NCTS,K,LAC(3),
     1NDAYTI,NM,ID,LOC(9),NSPNST,NNSCTD,NMISSN(100,16),NC
      COMMON/INFO3/NTYPE,NAREA,NSNA,NSCA,NSSA,NSTA(25,12),
     1NHACT(20,6),NTPR,NPRT(3),NTPA,NMISA(20,3),
     2NCASA(10,3),IF,NPA(3)
      COMMON/INFO4/NRTN,NISSN,NACE,NPANE,NPLANE(15,16)
      COMMON/INFO6/JPRI,JDEC,NCLOSE
      COMMON/INFO7/DIST,DISTR,XHRST
      NTRANS=0
C
C         DETERMINE IF C-130 IS TO A) GO FROM ONE STATION TO
C         ANOTHER, B) GO ON A MISSION, C) TAKE OFF FROM A
C         STATION FOR A CASE, OR D) DIVERT FROM ONE CASE TO
C         ANOTHER - THEN GO TO APPROPRIATE SECTION OF SUB-
C         ROUTINE
C
      IF(NRTN.GT.0) GO TO 5170
      IF(NISSN.GT.0) GO TO 5150
      IF(NPLANE(NPANE,2).EQ.0) GO TO 5100
C
C         C-130 IS BEING DIVERTED FROM ONE CASE TO ANOTHER
C         CASE - IDENTIFY CASE DIVERTING FROM
C
      I=NCLOSE
C
C         DETERMINE WHETHER C-130 IS ENROUTE TO, RETURNING
C         FROM OR ON-SCENE THE CASE IT IS BEING DIVERTED
C         FROM
C
 5050 IF(NPLANE(NPANE,2).EQ.7) GO TO 5070
      IF(NPLANE(NPANE,2).EQ.5) GO TO 5060
```

```
C
C          ADJUST CASE VECTOR OF CASE BEING DIVERTED FROM AS
C          NECESSARY
C
      NCASE(I,17)=NCASE(I,17)-1
 5060 NCASE(I,11)=NCASE(I,11)-1
C
C          ADJUST PLANE VECTOR RELATIVE TO NEW CASE BEING DI-
C          VERTED ON
C
 5070 NPLANE(NPANE,2)=5
      NPLANE(NPANE,4)=(DIST/290.0)+0.5
      NPLANE(NPANE,6)=NCASE(NACE,16)
      NPLANE(NPANE,8)=NCASE(NACE,6)
C
C          ADJUST CASE VECTOR OF CASE TO WHICH THE C-130 IS
C          BEING DIVERTED TO INDICATE PLANE IS ASSIGNED
C
      NCASE(NACE,11)=NCASE(NACE,11)+1
C
C          IF CASE DOES NOT HAVE ENOUGH AIRCRAFT ASSIGNED DO
C          NOT CHANGE ITS TIME FOR NEXT AIRCRAFT DEPARTURE -
C          OTHERWISE, DETERMINE TIME OF NEXT C-130 DEPARTURE
C          REQUIREMENT CONSIDERING WHETHER CASE IS CONTINUOUS
C          ON-SCENE RELIEF TYPE OR NOT
C
      IF(NCASE(NACE,11).LT.NCASE(NACE,7)) GO TO 5090
      IF(NCASE(NACE,2).EQ.1) GO TO 5080
      NCASE(NACE,9)=NCTS+30-NDAYTI
      GO TO 5090
 5080 NCASE(NACE,9)=NCTS+10-((DISTR/290.0)*2)-NPLANE
     1(NPANE,4)+0.5
C
C          UPDATE NUMBER OF C-130S REQUIRED IN CASE C-130
C          AREA AND TOTAL C-130S REQUIRED THIS TIME STEP
C
 5090 NPRT(NCASE(NACE,6))=NPRT(NCASE(NACE,6))-1
      NTPR=NTPR-1
C
C          IF CASE HAS AS MANY AIRCRAFT ASSIGNED AS REQUIRED
C          GO TO REMOVE ITS ACTION VECTOR- OTHERWISE RETURN
C
      IF(NCASE(NACE,11).GE.NCASE(NACE,7)) GO TO 5180
      GO TO 5310
C
C          C-130 IS TAKING OFF FROM A STATION TO GO ON A CASE
C          DETERMINE DISTANCE TO CASE FROM STATION
C
 5100 DIST=FLOAT(NCASE(NACE,11+NPLANE(NPANE,9)))
C
C          IF C-130 IS DEPARTING FROM THE STATION CLOSEST TO
C          THE CASE, NO EXTRA FLIGHT HOURS ARE INVOLVED.  IF
C          NOT, SEE IF IT CAN GET TO SCENE AND HAVE AT LEAST
C          ONE HOUR ON SCENE, IF NOT, SEND IT TO CLOSEST STA-
C          TION.  TALLY EXTRA FLIGHT HOURS INVOLVED IF IT CAN
C          NOT GO DIRECTLY TO SCENE
C
      IF(NPLANE(NPANE,9).EQ.NCASE(NACE,6)) GO TO 5120
      DISTR=NCASE(NACE,11+NCASE(NACE,6))
      NTTT=((DIST+DISTR)/290.0)+0.5
      IF(NTTT.GT.9) GO TO 5110
      XHRS=FLOAT(NCASE(NACE,11+NPLANE(NPANE,9))-NCASE(NACE,
     111+NCASE(NACE,6)))/290.0
      XHRST=XHRST+XHRS
      GO TO 5120
C
C          C-130 CAN NOT GET TO SCENE AND HAVE AT LEAST ONE
C          HOUR ON-SCENE FROM STATION IT IS AT SO MUST GO TO
C          STATION CLOSEST TO CASE.  DETERMINE DISTANCE TO
C          CLOSEST STATION AND FLIGHT TIME CORRECTED FOR FLY-
C          ING AIRWAYS VS DIRECT
C
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 5110 DISTG=FLOAT(LAC(NCASE(NACE,6))-LAC(NPLANE(NPANE,9)))
      NTTG=(DISTG/290.0)*1.1975
C
C          LOAD PLANE VECTOR TO INDICATE GOING TO STATION
C          CLOSEST TO CASE AND TALLY EXTRA FLIGHT HOURS
C
      NPLANE(NPANE,2)=8
      NPLANE(NPANE,4)=NCTS+NTTG
      NPLANE(NPANE,8)=NCASE(NACE,6)
      NPLANE(NPANE,10)=NCTS
      XHRS=(DISTG/290.0)*1.1975
      XHRST=XHRST+XHRS
C
C          DETERMINE TIME OF NEXT C-130 DEPARTURE REQUIREMENT
C          CONSIDERING ARRIVAL TIME OF C-130 AT CLOSEST STA-
C          TION, TIME OF DAY AND WHETHER CASE IS CONTINUOUS
C          ON-SCENE RELIEF TYPE OR NOT
C
      IF(NCASE(NACE,2).EQ.1) GO TO 5115
      NCASE(NACE,9)=NCTS+NTTG+1
      IF(NCASE(NACE,9).GT.16) GO TO 5115
      GO TO 5119
 5115 IF(NCASE(NACE,2).EQ.1) GO TO 5118
      NCASE(NACE,9)=30+NCTS-NDAYTI
      GO TO 5119
 5118 NCASE(NACE,9)=NCTS+1
C
C          UPDATE C-130S REQUIRED IN CASE AREA AND TOTAL
C          C-130S REQUIRED AND AVAILABLE FOR CURRENT TIME
C          STEP.  INITIALIZE PLANE TRANSFER INDICATOR AND GO
C          TO SEE IF FURTHER ACTION REQUIRED ON SUBJECT CASE
C
 5119 NPRT(NCASE(NACE,6))=NPRT(NCASE(NACE,6))-1
      NTPR=NTPR-1
      NTPA=NTPA-1
      NTRANS=1
      GO TO 5180
C
C          LOAD PLANE VECTOR FOR C-130 DEPARTING FROM STATION
C          AND GOING TO CASE SCENE
C
 5120 NPLANE(NPANE,2)=5
      NPLANE(NPANE,4)=NCTS+(DIST/290.0)+0.5
      NPLANE(NPANE,6)=NCASE(NACE,16)
      NPLANE(NPANE,8)=NCASE(NACE,6)
      NPLANE(NPANE,10)=NCTS
C
C          ADJUST CASE VECTOR TO INDICATE PLANE ASSIGNED AND
C          DETERMINE TIME OF NEXT C-130 DEPARTURE REQUIREMENT
C          CONSIDERING WHETHER CASE NEEDS ANOTHER PLANE THIS
C          TIME STEP, AND WHETHER CASE IS CONTINUOUS ON-SCENE
C          RELIEF TYPE OR NOT
C
      NCASE(NACE,11)=NCASE(NACE,11)+1
      IF(NCASE(NACE,11).LT.NCASE(NACE,7)) GO TO 5140
      IF(NCASE(NACE,2).EQ.1) GO TO 5130
      NCASE(NACE,9)=NCTS+30-NDAYTI
      GO TO 5140
 5130 NCASE(NACE,9)=NCTS+10-((FLOAT(NCASE(NACE,11+NCASE
     1(NACE,6)))/290.0)*2.0)+0.5
C
C          UPDATE NUMBER OF C-130S REQUIRED IN CASE C-130
C          AREA, NUMBER OF C-130S AVAILABLE IN C-130 AREA
C          AIRCRAFT DEPARTED FROM AND TOTAL C-130S REQUIRED
C          AND AVAILABLE THIS TIME STEP
C
 5140 NPRT(NCASE(NACE,6))=NPRT(NCASE(NACE,6))-1
      NTPR=NTPR-1
      NTPA=NTPA-1
      NPA(NPLANE(NPANE,9))=NPA(NPLANE(NPANE,9))-1
C
C          IF MORE C-130S REQUIRED FOR SUBJECT CASE IN CUR-
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```
C         RENT TIME STEP, RETURN - OTHERWISE GC TC ZERO CASE
C         ACTION VECTOR
C
      IF(NCASE(NACE,11).GE.NCASE(NACE,7)) GO TO 5180
      GC TO 5310
C
C         C-130 IS BEING SENT ON A MISSION.  IF AIRCRAFT IS
C         DEPARTING FROM STATION CLOSEST TO PICK UP POINT GO
C         TO ADJUST PLANE AND MISSION VECTORS - CTHERWISE
C         DETERMINE AND TALLY EXTRA FLYING HOURS REQUIRED
C
 5150 IF(NPLANE(NPANE,9).EQ.NMISSN(NISSN,6)) GC TC 5160
      XHRS=(FLOAT(NMISSN(NISSN,11+NPLANE(NPANE,6))-
     1NMISSN(NISSN,11+NMISSN(NISSN,6)))/290.0)*2.0
      IF(NPLANE(NPANE,1).EQ.NMISSN(NISSN,6)) XHRS=XHRS/2.0
      XHRST=XHRST+XHRS
C
C         ADJUST MISSION VECTOR TO INDICATE AIRCRAFT IS
C         ASSIGNED AND ADJUST PLANE VECTOR FOR MISSION
C         ASSIGNMENT
C
 5160 NMISSN(NISSN,11)=NMISSN(NISSN,11)+1
      NPLANE(NPANE,2)=4
      NPLANE(NPANE,4)=NCTS+NMISSN(NISSN,15)
      NPLANE(NPANE,7)=NMISSN(NISSN,16)
      NPLANE(NPANE,8)=NPLANE(NPANE,1)
      NPLANE(NPANE,10)=NCTS
C
C         UPDATE C-130S REQUIRED IN MISSION PICK UP AREA,
C         C-130S AVAILABLE IN C-130 AREA AIRCRAFT DEPARTED
C         FROM AND TOTAL C-130S REQUIREC AND AVAILABLE THIS
C         TIME STEP
C
      NPRT(NMISSN(NISSN,6))=NPRT(NMISSN(NISSN,6))-1
      NTPR=NTPR-1
      NTPA=NTPA-1
      NPA(NPLANE(NPANE,9))=NPA(NPLANE(NPANE,9))-1
C
C         IF THE SUBJECT MISSION DOES NOT REQUIRE ANYMORE
C         C-130S, GO TO ZERO MISSION ACTICN VECTCR - OTHER-
C         WISE RETURN
C
      IF(NMISSN(NISSN,11).GE.NMISSN(NISSN,7)) GC TO 5180
      GO TO 5310
C
C         C-130 IS BEING TRANSFERRED FROM ANOTHER C-130 STA-
C         TION TO ITS HOME STATION.  DETERMINE AND TALLY
C         EXTRA FLIGHT HOURS CORRECTED FOR FLYING AIRWAYS,
C         ADJUST PLANE VECTOR AND THEN RETURN
C
 5170 DIST=FLOAT(LAC(NPLANE(NPANE,1))-LAC(NPLANE(NPANE,9)))
      IF(DIST.LT.0) DIST=-(DIST)
      XHRS=(DIST/290.0)*1.1975
      XHRST=XHRST+XHRS
      NPLANE(NPANE,2)=8
      NPLANE(NPANE,4)=NCTS+XHRS
      NPLANE(NPANE,8)=NPLANE(NPANE,1)
      NPLANE(NPANE,10)=NCTS
      NPLANE(NPANE,6)=0
      NPLANE(NPANE,7)=0
      GO TO 5310
C
C         IF C-130 WAS ASSIGNED TO MISSICN GO TC DETERMINE
C         IF MISSION REQUIRES FURTHER ACTION THIS TIME STEP
C
 5180 IF(NISSN.GT.0) GC TC 5245
      DO 5190 J=1,10
      IF(NCASA(J,1).EQ.NACE) GO TO 5200
 5190 CONTINUE
C
C         DETERMINE IF CASE THAT THE C-130 WAS ASSIGNED TO
C         REQUIRES MORE C-130S THIS TIME STEP, IF SC RETURN
```

```
C          - OTHERWISE ZERO CASE ACTION VECTOR
C
 5200 IF(NTRANS.EQ.1) GO TO 5204
      IF(NCASE(NCASA(J,1),11).LT.NCASE(NCASA(J,1),7)) GO TO
     15310
      GO TO 5208
 5204 IF(NCASE(NCASA(J,1),11)+1.LT.NCASE(NCASA(J,1),7)) GO
     1TO 5310
C
C          NO FURTHER ACTION REQUIRED ON SUBJECT CASE THIS
C          TIME STEP SO ZERO ITS ACTION VECTOR AND RETURN
C
 5208 DO 5220 I=J,10
      IF(NCASA(I+1,1).EQ.0) GO TO 5230
      DO 5210 M=1,3
      NCASA(I,M)=NCASA(I+1,M)
 5210 CONTINUE
 5220 CONTINUE
 5230 DO 5240 M=1,3
      NCASA(I,M)=0
 5240 CONTINUE
      GO TO 5310
C
C          DETERMINE IF MISSION THAT THE C-130 WAS ASSIGNED
C          TO REQUIRES MORE C-130S, IF SO RETURN - OTHERWISE
C          ZERO MISSION ACTION VECTOR
C
 5245 DO 5250 J=1,20
      IF(NMISA(J,1).EQ.NISSN) GO TO 5260
 5250 CONTINUE
 5260 IF(NMISSN(NMISA(J,1),11).LT.NMISSN(NMISA(J,1),7)) GO
     1TO 5310
C
C          NO FURTHER ACTION REQUIRED ON SUBJECT MISSION SO
C          ZERO ITS ACTION VECTOR AND RETURN
C
      DO 5280 I=J,20
      IF(NMISA(I+1,1).EQ.0) GO TO 5290
      DO 5270 M=1,3
      NMISA(I,M)=NMISA(I+1,M)
 5270 CONTINUE
 5280 CONTINUE
 5290 DO 5300 M=1,3
      NMISA(I,M)=0
 5300 CONTINUE
C
C          ZERO KEY INDICATORS PRIOR TO DEPARTING SUBROUTINE
C
 5310 NISSN=0
      NACE=0
      NRTN=0
 5320 RETURN
      END
```

```
C*********************************************************************
C****                                                             ****
C****                     SUBROUTINE PLANE                        ****
C****                                                             ****
C*********************************************************************
C
C
C        THE KEY CALLING PARAMETERS FOR SUBROUTINE PLANE
C        ARE THE C-130 STATION THE C-130 IS TO COME FROM
C        (NAREA) AND THE C-130 STATION AREA IN WHICH THE
C        CASE OR MISSION PICK-UP POINT IS LOCATED.  PRIOR
C        TO ENTERING THE SUBROUTINE IT IS KNOWN THAT AT
C        LEAST ONE C-130 IS AVAILABLE AT THE SUBJECT
C        STATION
C
C        THE FUNCTION OF SUBROUTINE PLANE IS TO DETERMINE
C        THE C-130 AT THE SUBJECT STATION WHICH IS TO BE
C        ASSIGNED TO THE CASE OR MISSION IN QUESTION.  THE
C        SUBROUTINE FIRST ATTEMPTS TO ASSIGN A PLANE FROM
C        THE SUBJECT STATION WHOSE HOME STATION IS CLOSEST
C        TO THE CASE OR MISSION PICK UP POINT.  IF THIS
C        FAILS, THE SUBROUTINE TAKES THE FIRST AVAILABLE
C        C-130 AT THE STATION AND DESIGNATES IT AS THE AIR-
C        CRAFT TO BE ASSIGNED TO THE CASE OR MISSION.  IF,
C        DURING THE PROCESS, A C-130 IS FOUND TO HAVE A
C        MECHANICAL DISCREPANCY ON START UP (PREDETERMIN-
C        ED), THE SUBROUTINE DOWNS THE PLANE AND DETERMINES
C        THE NUMBER OF HOURS UNTIL IT IS REPAIRED.
C
C
      COMMON/INFO1/TCP(3),PCL(3),PCSC,PSCI,PSSC,PCSOU,PCNN,
     1PCGULF,Z,CDFA(4),CDFB(3),CDFC,PRI(3),PHOLD1,PHOLD2,
     2PSC,PPSC(3),PHOLD,PMEDIC,PMSC(3),PPUP(11),PSUBM,
     3QND1(4),QND2(6),QND3(15),PTAD,TSPDF(5),ALON,ALATN
      COMMON/INFO2/IC,NSCTD,NCASE(50,17),NCTS,K,LAC(3),
     1NDAYTI,NM,ID,LOC(9),NSPNST,NNSCTD,NMISSN(100,16),NC
      COMMON/INFO3/NTYPE,NAREA,NSNA,NSCA,NSSA,NSTA(25,12),
     1NHACT(20,6),NTPR,NPRT(3),NTPA,NMISA(20,3),
     2NCASA(10,3),IF,NPA(3)
      COMMON/INFO4/NRTN,NISSN,NACE,NPANE,NPLANE(15,16)
      COMMON/INFO5/IE,NAREAS,NPLUSE,NPIS
C
C        DETERMINE IF THERE IS A PLANE AT THE SUBJECT C-130
C        STATION WHOSE HOME STATION IS CLOSEST TO THE CASE
C        OR MISSION LOCATION
C
      DO 5060 J=1,NPIS
      IF(NPLANE(J,9).EQ.NAREA) GO TO 5000
      GO TO 5060
 5000 IF(NPLANE(J,1).EQ.NAREAS) GO TO 5010
      GO TO 5060
C
C        C-130 AT SUBJECT STATION IS FROM STATION CLOSEST
C        TO THE CASE OR MISSION LOCATION SO SEE IF IT IS
C        ABLE TO GO ON CASE OR MISSION
C
 5010 IF(NPLANE(J,2).EQ.3) GO TO 5020
      IF(NPLANE(J,2).EQ.0) GO TO 5050
C
C        C-130 NOT ABLE TO GO ON CASE OR MISSION; IT IS
C        EITHER FLYING OR DOWN SO CHECK OTHER PLANES AT
C        STATION
C
      GO TO 5060
C
C        THE C-130 HAD A MAINTENANCE DISCREPANCY ON START
C        UP SO FIND OUT HOW LONG IT WILL BE DOWN, ADJUST
C        THE PLANE VECTOR AND THEN CHECK OTHER C-130S AT
```

```
C          STATION
C
 5020 IE=IE*K
      RX=0.5+FLOAT(IE)*Z
      DO 5030 M=1,5
      IF(RX.LE.TSPDF(M)) GO TO 5040
 5030 CONTINUE
 5040 IF(M.EQ.1) NTSD=2
      IF(M.EQ.2) NTSD=4
      IF(M.EQ.3) NTSD=8
      IF(M.EQ.4) NTSD=24
      IF(M.EQ.5) NTSD=72
      NPLANE(J,4)=NCTS+NTSD
      NPLANE(J,2)=2
      GO TO 5060
C
C          THE C-130 IS ABLE TO GO ON CASE OR MISSION SO DES-
C          IGNATE THIS AIRCRAFT AS THE ONE TO GO AND RETURN
C
 5050 NPLUSE=J
      GO TO 5130
 5060 CONTINUE
C
C          UNABLE TO FIND A PLANE AT THE SUBJECT STATION
C          WHOSE HOME STATION IS CLOSEST TO CASE OR MISSION
C          LOCATION AND IS ABLE TO GO SO CHECK ALL PLANES AT
C          SUBJECT STATION AND TAKE FIRST ONE ABLE TO GO
C
      DO 5120 J=1,NPIS
      IF(NPLANE(J,9).EQ.NAREA) GO TO 5070
      GO TO 5120
 5070 IF(NPLANE(J,2).EQ.3) GO TO 5080
      IF(NPLANE(J,2).EQ.0) GO TO 5110
C
C          THIS C-130 IS UNABLE TO GO ON CASE OR MISSION, IT
C          IS EITHER FLYING OR DOWN SO CHECK OTHER PLANES AT
C          STATION
C
      GO TO 5120
C
C          THIS C-130 HAD A MAINTENANCE DISCREPANCY ON START
C          UP SO FIND OUT HOW LONG IT WILL BE DOWN, ADJUST
C          THE PLANE VECTOR AND THEN CHECK OTHER C-130S AT
C          STATION
C
 5080 IE=IE*K
      RX=0.5+FLOAT(IE)*Z
      DO 5090 M=1,5
      IF(RX.LE.TSPDF(M)) GO TO 5100
 5090 CONTINUE
 5100 IF(M.EQ.1) NTSD=2
      IF(M.EQ.2) NTSD=4
      IF(M.EQ.3) NTSD=8
      IF(M.EQ.4) NTSD=24
      IF(M.EQ.5) NTSD=72
      NPLANE(J,4)=NCTS+NTSD
      NPLANE(J,2)=2
      GO TO 5120
C
C          THIS C-130 IS ABLE TO GO ON CASE OR MISSION SO
C          DESIGNATE THIS AIRCRAFT AS THE ONE TO GO AND
C          RETURN
C
 5110 NPLUSE=J
      GO TO 5130
 5120 CONTINUE
 5130 CONTINUE
      RETURN
      END
```

```
C**************************************************************
C****                                                      ****
C****                  SUBROUTINE ASSIGN                   ****
C****                                                      ****
C**************************************************************
C
C
C         THE KEY CALLING PARAMETERS FOR SUBROUTINE ASSIGN
C         ARE AN INDICATOR OF THE PRIORITY CLASS OF CASES OR
C         MISSIONS TO BE DEALT WITH (JPRI) AND AN INDICATOR
C         OF WHETHER TO CONSIDER CASES OR MISSIONS AND THE
C         LEVEL OF AIRCRAFT ASSIGNMENT TO BE ATTEMPTED (1,
C         50 PER CENT, OR TOTAL) FOR EACH CASE OR MISSION
C         OF THE SPECIFIED PRIORITY (JDEC).
C
C         THE FUNCTION OF SUBROUTINE ASSIGN IS TO ATTEMPT TO
C         ASSIGN C-130S TO CASES OR MISSIONS OF THE PRIORITY
C         SPECIFIED IN ORDER TO BRING THEIR LEVEL OF ASSIGN-
C         ED AIRCRAFT TO THE LEVEL SPECIFIED.  ASSIGNMENTS
C         ARE MADE WITH AIRCRAFT AT THE CLOSEST STATION TO
C         THE CASE SCENES OR MISSION PICK UP POINTS FIRST
C         AND THEN, IF C-130S REMAIN AVAILABLE AND ARE RE-
C         QUIRED FOR PRIORITY ONE OR TWO CASES OR MISSIONS
C         THEY ARE SENT FROM OTHER C-130 STATIONS.  IN THE
C         CASE OF PRIORITY ONE CASES WHICH DO NOT HAVE ANY
C         AIRCRAFT ASSIGNED AND THERE ARE NO C-130S AVAIL-
C         ABLE, ATTEMPTS ARE MADE TO FIND OTHER CASES IN THE
C         PRIORITY ONE CASE AREA WITH MORE THAN ONE AIRCRAFT
C         ASSIGNED AND DIVERT A C-130 FROM SUCH A CASE TO
C         THE PRIORITY ONE CASE WITHOUT ANY AIRCRAFT ASSIGN-
C         ED.
C
C
C
      DIMENSION NUR(3)
      COMMON/INFO1/TCP(3),PCL(3),PCSC,PSCI,PSSC,PCSCU,PCNN,
     1PCGULF,Z,CDFA(4),CDFB(3),CDFC,PRI(3),PHOLD1,PHOLD2,
     2PSC,PPSC(3),PHOLD,PMEDIC,PMSC(3),PPUP(11),PSUBM,
     3QND1(4),QND2(6),QND3(15),PTAD,TSPDF(5),ALON,ALATN
      COMMON/INFO2/IC,NSCTD,NCASE(50,17),NCTS,K,LAC(3),
     1NDAYTI,NM,ID,LOC(9),NSPNST,NNSCTD,NMISSN(100,16),NC
      COMMON/INFO3/NTYPE,NAREA,NSNA,NSCA,NSSA,NSTA(25,12),
     1NHACT(20,6),NTPR,NPRT(3),NTPA,NMISA(20,3),
     2NCASA(10,3),IF,NPA(3)
      COMMON/INFO4/NRTN,NISSN,NACE,NPANE,NPLANE(15,16)
      COMMON/INFO5/IE,NAREAS,NPLUSE,NPIS
      COMMON/INFO6/JPRI,JDEC,NCLOSE
      COMMON/INFO7/DIST,DISTR,XHRST
C
C         ZERO TALLY VECTORS FOR C-130S REQUIRED IN THE
C         THREE AREAS FOR CASE OR MISSION PRIORITY BEING
C         EXAMINED
C
      NUR(1)=0
      NUR(2)=0
      NUR(3)=0
C
C         IF EXAMINING ANY PRIORITY OF MISSION, GO TO
C         MISSION SECTION
C
      IF(JDEC.GT.3) GO TO 5260
C
C         EXAMINING CASES OF PARTICULAR PRIORITY AND LEVEL
C         OF AIRCRAFT ASSIGNMENT.  FIND CASES OF THAT PRI-
C         ORITY WHICH REQUIRE A C-130 THIS TIME STEP
C
      DO 5050 I=1,10
 5000 IF(NCASA(I,2).EQ.0) GO TO 5060
      IF(NCASA(I,2).GT.JPRI) GO TO 5060
```

```
      IF(NCASA(I,2).EQ.JPRI) GO TO 5010
      GO TO 5050
C
C          DETERMINE WHAT LEVEL OF AIRCRAFT ASSIGNMENT IS BE-
C          ING EXAMINED.  IF CHECKING FOR 50 PERCENT, SKIP
C          TO 50 PERCENT SECTION
C
 5010 IF(JDEC.EQ.2) GO TO 5020
C
C          CHECKING EITHER TO SEE IF CASE HAS AT LEAST ONE
C          PLANE OR IF IT HAS ALL THE PLANES IT REQUIRES.  IF
C          CASE DOES NOT HAVE ANY PLANES ASSIGNED, GO TO SEE
C          IF ONE CAN BE ASSIGNED FROM THE STATION CLOSEST TO
C          THE SCENE.  IF CASE HAS AT LEAST ONE PLANE AND
C          CHECKING FOR ONE PLANE ASSIGNED, GO TO NEXT CASE.
C          IF CHECKING TO GIVE CASE TOTAL PLANES REQUIRED GO
C          TO SEE IF CAN ASSIGN REQUIRED PLANES FROM THE STA-
C          TION CLOSEST TO THE SCENE
C
      IF(NCASE(NCASA(I,1),11).EQ.0) GO TO 5030
      IF(JDEC.EQ.0) GO TO 5030
      GO TO 5050
C
C          CHECKING FOR CASES HAVING 50 PERCENT OF AIRCRAFT
C          REQUIRED.  IF CASE DOES NOT HAVE 50 PERCENT SEE IF
C          ONE CAN BE ASSIGNED FROM THE STATION CLOSEST TO
C          THE SCENE.  OTHERWISE EXAMINE NEXT CASE
C
 5020 DECIDE=FLOAT(NCASE(NCASA(I,1),7))/2.0
      IF(NCASE(NCASA(I,1),11).LE.DECIDE) GO TO 5030
      GO TO 5050
C
C          CASE MEETS CRITERIA FOR HAVING C-130 ASSIGNED
C          (PRIORITY, LEVEL OF ASSIGNMENT) SO SEE IF C-130 IS
C          AVAILABLE AT C-130 STATION CLOSEST TO THE CASE.
C          IF ONE NOT AVAILABLE GO TO TALLY REQUIREMENT.
C
 5030 IF(NPA(NCASA(I,3)).EQ.0) GO TO 5040
C
C          PLANE IS AVAILABLE AT C-130 STATION CLOSEST TO THE
C          CASE SO INITIALIZE CALLING PARAMETERS FOR AREA AND
C          STATION AND CALL SUBROUTINE PLANE
C
      NAREA=NCASA(I,3)
      NAREAS=NCASA(I,3)
      CALL PLANE
C
C          INITIALIZE CALLING PARAMETERS FOR CASE NUMBER AND
C          C-130 TO BE USED AND CALL SUBROUTINE FILL
C
      NACE=NCASA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C          IF NO MORE C-130S ARE REQUIRED THIS TIME STEP, RE-
C          TURN.  IF NO MORE C-130S ARE AVAILABLE GO TO MAKE
C          DECISION ON FURTHER ACTION.  IF MORE C-130S ARE
C          REQUIRED AND AVAILABLE, LOOK AT NEXT CASE
C
      IF(NTPR.EQ.0) GO TO 5700
      IF(NTPA.EQ.0) GO TO 5032
      GO TO 5000
C
C          MORE C-130S ARE REQUIRED BUT NONE ARE AVAILABLE.
C          IF CHECKING FOR ONE PLANE ASSIGNED TO EACH PRI-
C          ORITY ONE CASE, CONTINUE - OTHERWISE RETURN
C
 5032 IF(JPRI.GT.1) GO TO 5700
      IF(JDEC.EQ.1) GO TO 5000
      GO TO 5700
C
C          NO C-130S ARE AVAILABLE AT CLOSEST STATION TO CASE
```

```
C         IF EXAMINING PRIORITY THREE CASES, WILL NOT BRING
C         AIRCRAFT FROM ANOTHER STATION SO JUST CONTINUE -
C         OTHERWISE, TALLY NUMBER OF AIRCRAFT REQUIRED DE-
C         PENDING ON LEVEL OF ASSIGNMENT BEING EXAMINED
C
 5040 IF(JDEC.EQ.0) GO TO 5045
      IF(JDEC.EQ.-1) GO TO 5050
      NUR(NCASA(I,3))=NUR(NCASA(I,3))+1
      GO TO 5050
 5045 NUR(NCASA(I,3))=NUR(NCASA(I,3))+NCASE(NCASA(I,1),7)-
     1NCASE(NCASA(I,1),11)
 5050 CONTINUE
C
C         ALL CASES REQUIRING ACTION THIS TIME STEP HAVE
C         BEEN EXAMINED.  THOSE OF THE SPECIFIED PRIORITY
C         WHICH ARE BELOW THE SPECIFIED LEVEL OF ASSIGNMENT
C         AND FOR WHICH SUFFICIENT C-130S WERE NOT AVAILABLE
C         AT THE CLOSEST STATION HAVE BEEN TALLIED.  SEE IF
C         THERE ARE ANY CASES TO BE ACTED ON - IF NOT, RE-
C         TURN
C
 5060 DO 5070 M=1,3
      IF(NUR(M).GT.0) GO TO 5080
 5070 CONTINUE
      GO TO 5700
C
C         THERE ARE CASES MEETING ALL CRITERIA FOR BEING
C         ASSIGNED AIRCRAFT.  TALLY TOTAL NUMBER OF C-130S
C         REQUIRED AND SEE IF ANY C-130S ARE AVAILABLE.  IF
C         THERE ARE NOT ANY C-130S AVAILABLE AND EXAMINING
C         OTHER THAN PRIORITY ONE CASES FOR ONE AIRCRAFT,
C         RETURN - OTHERWISE TRY TO DIVERT A C-130 ON A LOW-
C         ER PRIORITY CASE.  IF THERE ARE C-130S AVAILABLE,
C         CONTINUE
C
 5080 NTUR=NUR(1)+NUR(2)+NUR(3)
      IF(NTPA.GT.0) GO TO 5090
      IF(JPPI.GT.1) GO TO 5700
      IF(JDEC.GT.1) GO TO 5700
      IF(JDEC.EQ.0) GO TO 5700
      GO TO 5520
C
C         DETERMINE C-130 STATION AREAS WHERE CASES REQUIRE
C         C-130S AND HANDLE THE REQUIREMENTS BY AREAS
C
 5090 IF(NUR(1).GT.0) GO TO 5140
      IF(NUR(2).GT.0) GO TO 5190
      IF(NUR(3).EQ.0) GO TO 5700
C
C         A C-130 IS REQUIRED FOR A CASE IN THE SOUTHERN
C         AREA.  IF A C-130 IS AVAILABLE IN THE CENTRAL AREA
C         TAKE IT, OTHERWISE TAKE ONE FROM THE NORTHERN AREA
C         INITIALIZE CALLING PARAMETERS ACCORDINGLY AND CALL
C         SUBROUTINE PLANE
C
      IF(NPA(2).EQ.0) GO TO 5100
      NAREA=2
      GO TO 5110
 5100 NAREA=1
 5110 NAREAS=3
      CALL PLANE
C
C         LOCATE CASE REQUIRING THE C-130, INITIALIZE CALL-
C         ING PARAMETERS AND CALL SUBROUTINE FILL
C
      DO 5120 I=1,10
      IF(NCASA(I,3).EQ.3) GO TO 5130
 5120 CONTINUE
 5130 NACE=NCASA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
```

```
C         IF NO FURTHER C-130S ARE REQUIRED THIS TIME STEP,
C         RETURN - OTHERWISE ADJUST AREA AND TOTAL C-130 RE-
C         QUIREMENT TALLIES AND HANDLE NEXT CASE REQUIRING
C         C-130 IN SOUTHERN AREA
C
      IF(NTPR.EQ.0) GO TO 5700
      NUR(3)=NUR(3)-1
      NTUR=NTUR-1
      IF(NUR(3).GT.0) GO TO 5080
      GO TO 5700
C
C         A C-130 IS REQUIRED FOR A CASE IN THE NORTHERN
C         AREA.  IF A C-130 IS AVAILABLE IN THE CENTRAL AREA
C         TAKE IT, OTHERWISE TAKE ONE FROM THE SOUTHERN AREA
C         INITIALIZE CALLING PARAMETERS ACCORDINGLY AND CALL
C         SUBROUTINE PLANE
C
 5140 IF(NPA(2).EQ.0) GO TO 5150
      NAREA=2
      GO TO 5160
 5150 NAREA=3
 5160 NAREAS=1
      CALL PLANE
C
C         LOCATE CASE REQUIRING THE C-130, INITIALIZE CALL-
C         ING PARAMETERS AND CALL SUBROUTINE FILL
C
      DO 5170 I=1,10
      IF(NCASA(I,3).EQ.1) GO TO 5180
 5170 CONTINUE
 5180 NACE=NCASA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C         IF NO FURTHER C-130S ARE REQUIRED THIS TIME STEP,
C         RETURN - OTHERWISE ADJUST AREA AND TOTAL C-130 RE-
C         QUIREMENT TALLIES AND GO TO FIND THE NEXT CASE RE-
C         QUIRING A C-130, BY AREA, AND HANDLE IT
C
      IF(NTPR.EQ.0) GO TO 5700
      NUR(1)=NUR(1)-1
      NTUR=NTUR-1
      IF(NTUR.GT.0) GO TO 5080
      GO TO 5700
C
C         A C-130 IS REQUIRED FOR A CASE IN THE CENTRAL AREA
C         DETERMINE WHICH OTHER C-130 STATION AREA THE CASE
C         IS CLOSEST TO AND TAKE A C-130 FROM THAT STATION
C         IF AVAILABLE, IF NOT, TAKE PLANE FROM THE OTHER
C         STATION.  INITIALIZE CALLING PARAMETERS ACCORDING-
C         LY AND CALL SUBROUTINE PLANE
C
 5190 DO 5200 I=1,10
      IF(NCASA(I,3).EQ.2) GO TO 5210
 5200 CONTINUE
 5210 IF(NCASE(NCASA(I,1),12).LT.NCASE(NCASA(I,1),14)) GO
     1TO 5230
      IF(NPA(3).EQ.0) GO TO 5230
 5220 NAREA=3
      GO TO 5240
 5230 IF(NPA(1).EQ.0) GO TO 5220
      NAREA=1
 5240 NAREAS=2
      CALL PLANE
C
C         INITIALIZE CALLING PARAMETERS WITH C-130 AND CASE
C         AND CALL SUBROUTINE FILL
C
      NACE=NCASA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
```

```
C          IF NO FURTHER C-130S ARE REQUIRED THIS TIME STEP,
C          RETURN - OTHERWISE ADJUST AREA AND TOTAL C-130
C          REQUIREMENT TALLIES AND GO TO FIND THE NEXT CASE
C          REQUIRING A C-130, BY AREA, AND HANDLE IT
C
      IF(NTPR.EQ.0) GO TO 5700
      NUR(2)=NUR(2)-1
      NTUR=NTUR-1
      IF(NTUR.GT.0) GO TO 5080
      GO TO 5700
 5260 DO 5310 I=1,20
C
C          EXAMINING MISSIONS OF PARTICULAR PRIORITY AND LEV-
C          EL OF AIRCRAFT ASSIGNMENT.  FIND MISSIONS OF THAT
C          PRIORITY WHICH REQUIRE A C-130 THIS TIME STEP
C
 5270 IF(NMISA(I,2).EQ.0) GO TO 5320
      IF(NMISA(I,2).GT.JPRI) GO TO 5320
      IF(NMISA(I,2).EQ.JPRI) GO TO 5280
      GO TO 5310
C
C          IF MISSION ALREADY HAS ONE PLANE AND NOT ATTEMPT-
C          ING FULL ASSIGNMENT THEN EXAMINE THE NEXT MISSION
C          REQUIRING ACTION THIS TIME STEP - OTHERWISE
C          CONTINUE
C
 5280 IF(NMISSN(NMISA(I,1),11).EQ.0) GO TO 5290
      IF(JDEC.EQ.5) GO TO 5290
      GO TO 5310
C
C          MISSION MEETS CRITERIA FOR HAVING C-130 ASSIGNED
C          (PRIORITY, LEVEL OF ASSIGNMENT) SO SEE IF C-130 IS
C          AVAILABLE AT C-130 STATION CLOSEST TO THE MISSION
C          PICK UP POINT.  IF ONE NOT AVAILABLE GO TO TALLY
C          REQUIREMENT
C
 5290 IF(NPA(NMISA(I,3)).EQ.0) GO TO 5300
C
C          C-130 IS AVAILABLE AT STATION CLOSEST TO THE
C          MISSION PICK UP POINT SO INITIALIZE CALLING PARAM-
C          ETERS FOR AREA AND STATION AND CALL SUBROUTINE
C          PLANE
C
      NAREA=NMISA(I,3)
      NAREAS=NMISA(I,3)
      CALL PLANE
C
C          INITIALIZE CALLING PARAMETERS FOR MISSION NUMBER
C          AND C-130 TO BE USED AND CALL SUBROUTINE FILL
C
      NISSN=NMISA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C          IF NO MORE C-130S ARE REQUIRED OR AVAILABLE THIS
C          TIME STEP, RETURN - OTHERWISE CHECK NEXT MISSION
C
      IF(NTPR.EQ.0) GO TO 5700
      IF(NTPA.EQ.0) GO TO 5700
      GO TO 5270
C
C          NO C-130S ARE AVAILABLE AT CLOSEST STATION TO
C          MISSION PICK UP POINT.  IF EXAMINING PRIORITY
C          THREE MISSIONS WILL NOT BRING AIRCRAFT FROM ANOTH-
C          ER STATION SO JUST CONTINUE - OTHERWISE TALLY
C          NUMBER OF AIRCRAFT REQUIRED DEPENDING ON LEVEL OF
C          ASSIGNMENT BEING EXAMINED
C
 5300 IF(JDEC.EQ.5) GO TO 5305
      IF(JDEC.EQ.10) GO TO 5310
      NUR(NMISA(I,3))=NUR(NMISA(I,3))+1
      GO TO 5310
```

```
 5305 NUR(NMISA(I,3))=NUR(NMISA(I,3))+NMISSN(NMISA(I,1),7)-
     1NMISSN(NMISA(I,1),11)
 5310 CONTINUE
C
C          ALL MISSIONS REQUIRING ACTION THIS TIME STEP HAVE
C          BEEN EXAMINED.  THOSE OF THE SPECIFIED PRIORITY
C          WHICH ARE BELOW THE SPECIFIED LEVEL OF ASSIGNMENT
C          AND FOR WHICH SUFFICIENT C-130S WERE NOT AVAILABLE
C          AT THE CLOSEST STATIONS HAVE BEEN TALLIED.  SEE IF
C          THERE ARE ANY MISSIONS TO BE ACTED ON - IF NOT,
C          RETURN
C
 5320 DO 5330 M=1,3
      IF(NUR(M).GT.0) GO TO 5340
 5330 CONTINUE
      GO TO 5700
C
C          THERE ARE MISSIONS MEETING ALL CRITERIA FOR BEING
C          ASSIGNED C-130S FROM STATIONS WHICH ARE NOT CLOS-
C          EST TO THE PICK UP POINT.  TALLY THE TOTAL NUMBER
C          OF C-130S REQUIRED.  DETERMINE C-130 STATION AREAS
C          WHERE MISSIONS REQUIRE C-130S AND HANDLE THE RE-
C          QUIREMENTS BY AREAS
C
 5340 NTUR=NUR(1)+NUR(2)+NUR(3)
      IF(NUR(1).GT.0) GO TO 5400
      IF(NUR(2).GT.0) GO TO 5450
      IF(NUR(3).EQ.0) GO TO 5700
C
C          A C-130 IS REQUIRED FOR A MISSION IN THE SOUTHERN
C          AREA.  IF A C-130 IS AVAILABLE IN THE CENTRAL AREA
C          TAKE IT, OTHERWISE TAKE ONE FROM THE NORTHERN AREA
C          INITIALIZE CALLING PARAMETERS ACCORDINGLY AND CALL
C          SUBROUTINE PLANE
C
 5350 IF(NPA(2).EQ.0) GO TO 5360
      NAREA=2
      GO TO 5370
 5360 NAREA=1
 5370 NAREAS=3
      CALL PLANE
C
C          LOCATE CASE REQUIRING THE C-130, INITIALIZE CALL-
C          ING PARAMETERS AND CALL SUBROUTINE FILL
C
      DO 5380 I=1,20
      IF(NMISA(I,3).EQ.3) GO TO 5390
 5380 CONTINUE
 5390 NISSN=NMISA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C          IF NO FURTHER C-130S ARE AVAILABLE OR REQUIRED
C          THIS TIME STEP, RETURN - OTHERWISE ADJUST AREA
C          C-130 TALLY AND HANDLE NEXT MISSION REQUIRING
C          C-130 IN SOUTHERN AREA
C
      IF(NTPR.EQ.0) GO TO 5700
      IF(NTPA.EQ.0) GO TO 5700
      NUR(3)=NUR(3)-1
      IF(NUR(3).GT.0) GO TO 5350
      GO TO 5700
C
C          A C-130 IS REQUIRED FOR A MISSION IN THE NORTHERN
C          AREA.  IF A C-130 IS AVAILABLE IN THE CENTRAL AREA
C          TAKE IT, OTHERWISE TAKE ONE FROM THE SOUTHERN AREA
C          INITIALIZE CALLING PARAMETERS ACCORDINGLY AND CALL
C          SUBROUTINE PLANE
C
 5400 IF(NPA(2).EQ.0) GO TO 5410
      NAREA=2
      GO TO 5420
```

```
 5410 NAREA=3
 5420 NAREAS=1
      CALL PLANE
C
C           LOCATE MISSION REQUIRING THE C-130, INITIALIZE
C           CALLING PARAMETERS AND CALL SUBROUTINE FILL
C
      DO 5430 I=1,20
      IF(NMISA(I,3).EQ.1) GO TO 5440
 5430 CONTINUE
 5440 NISSN=NMISA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C           IF NO FURTHER C-130S ARE AVAILABLE OR REQUIRED
C           THIS TIME STEP, RETURN - OTHERWISE ADJUST AREA AND
C           TOTAL C-130 REQUIREMENT TALLIES AND GO TO FIND
C           NEXT MISSION REQUIRING A C-130, BY AREA, AND
C           HANDLE IT
C
      IF(NTPR.EQ.0) GO TO 5700
      IF(NTPA.EQ.0) GO TO 5700
      NUR(1)=NUR(1)-1
      NTUR=NTUR-1
      IF(NTUR.EQ.0) GO TO 5700
      IF(NUR(1).GT.0) GO TO 5400
      GO TO 5340
C
C           A C-130 IS REQUIRED FOR A MISSION IN THE CENTRAL
C           AREA.  DETERMINE WHICH OTHER C-130 STATION AREA
C           THE MISSION PICK UP POINT IS CLOSEST TO AND TAKE A
C           C-130 FROM THAT STATION IF AVAILABLE, IF NOT,
C           TAKE C-130 FROM THE OTHER STATION.  INITIALIZE
C           CALLING PARAMETERS ACCORDINGLY AND CALL SUBROUTINE
C           PLANE
C
 5450 DO 5460 I=1,20
      IF(NMISA(I,3).EQ.2) GO TO 5470
 5460 CONTINUE
 5470 IF(NMISSN(NMISA(I,1),12).LT.NMISSN(NCASA(I,1),14)) GO
     1TO 5490
      IF(NPA(3).EQ.0) GO TO 5490
 5480 NAREA=3
      GO TO 5500
 5490 IF(NPA(1).EQ.0) GO TO 5480
      NAREA=1
 5500 NAREAS=2
      CALL PLANE
C
C           INITIALIZE CALLING PARAMETERS WITH C-130 AND
C           MISSION AND CALL SUBROUTINE FILL
C
      NISSN=NMISA(I,1)
      NPANE=NPLUSE
      CALL FILL
C
C           IF NO MORE C-130S ARE AVAILABLE OR REQUIRED THIS
C           TIME STEP, RETURN - OTHERWISE ADJUST AREA AND
C           TOTAL C-130 REQUIREMENT TALLIES AND GO TO FIND THE
C           NEXT MISSION REQUIRING A C-130, BY AREA, AND
C           HANDLE IT
C
 5510 IF(NTPR.EQ.0) GO TO 5700
      IF(NTPA.EQ.0) GO TO 5700
      NUR(2)=NUR(2)-1
      NTUR=NTUR-1
      IF(NTUR.EQ.0) GO TO 5700
      IF(NUR(2).GT.0) GO TO 5450
      GO TO 5350
C
C           THERE ARE NO C-130S AVAILABLE.  EXAMINING PRIORITY
C           ONE CASES WITHOUT ANY AIRCRAFT ASSIGNED.  MAKE
```

```
C          ATTEMPT TO DIVERT A C-130 FROM A LOWER PRIORITY
C          CASE WITH MORE THAN ONE C-130 ASSIGNED BEGINNING
C          WITH PRIORITY THREE CASES IN THE SUBJECT CASE AREA
C          AND WORKING UP.  DETERMINE AREA WHERE C-130 RE-
C          QUIRED AND INDICATE PRIORITY THREE CASES TO BE
C          EXAMINED FOR DIVERTING A C-130 FROM
C
 5520 IF(NUR(1).EQ.0) GO TO 5530
      ND=1
      GO TO 5550
 5530 IF(NUR(2).EQ.0) GO TO 5540
      ND=2
      GO TO 5550
 5540 ND=3
 5550 NTYD=3
C
C          DETERMINE IF THERE ARE ANY CASES IN THE SUBJECT
C          C-130 STATION AREA - IF NOT, GO TO SEE IF A DIVERT
C          IS REQUIRED IN ANOTHER AREA
C
 5560 DO 5670 I=1,50
      IF(NCASE(I,6).EQ.0) GO TO 5675
      IF(NCASE(I,6).EQ.ND) GO TO 5570
      GO TO 5670
C
C          THERE IS A CASE IN THE AREA, SEE IF IT IS OF THE
C          PRIORITY REQUIRED, IF NOT LOOK AT OTHER CASES IN
C          THE AREA
C
 5570 IF(NCASE(I,1).EQ.NTYD) GO TO 5580
      GO TO 5670
C
C          CASE IN THE AREA IS OF THE PRIORITY REQUIRED SO
C          SEE IF IT HAS MORE THAN ONE AIRCRAFT ASSIGNED - IF
C          NOT, LOOK AT OTHER CASES IN THE AREA
C
 5580 IF(NCASE(I,11).GT.1) GO TO 5590
      GO TO 5670
C
C          FIND CASE WHICH NEEDS THE C-130
C
 5590 DO 5600 M=1,10
      IF(NCASA(M,3).EQ.ND) GO TO 5610
 5600 CONTINUE
C
C          DETERMINE IF THE CASE WHICH HAS MORE THAN ONE AIR-
C          CRAFT ASSIGNED HAS A C-130 ASSIGNED AND IF SO,
C          WHICH ONE.  IF NOT, LOOK AT OTHER CASES IN THE
C          AREA
C
 5610 DO 5660 J=1,NPIS
      IF(NPLANE(J,6).EQ.NCASE(I,16)) GO TO 5620
      GO TO 5660
 5620 NC=NCASA(M,1)
C
C          INITIALIZE INDICATOR FOR CASE LOCATION IN NCASE
C          VECTOR ARRAY OF CASE THAT REQUIRES AIRCRAFT AND
C          DETERMINE APPROXIMATE LOCATION OF THE C-130 CON-
C          SIDERING WHETHER IT IS GOING TO, RETURNING FROM
C          OR ON-SCENE
C
      IF(NPLANE(J,2).EQ.5) GO TO 5630
      IF(NPLANE(J,2).EQ.6) GO TO 5640
      LATP=FLOAT(NCASE(I,3)+LAC(NPLANE(J,8)))/2.0
      LONP=FLOAT(NCASE(I,4))/2.0
      GO TO 5650
 5630 LATP=FLOAT(NCASE(I,3)+LAC(NPLANE(J,9)))/2.0
      LONP=FLOAT(NCASE(I,4))/2.0
      GO TO 5650
 5640 LATP=NCASE(I,3)
      LONP=NCASE(I,4)
C
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```
C          DETERMINE IF THE C-130 HAS ENOUGH FLIGHT ENDURANCE
C          REMAINING TO GET TO CASE, BE ON-SCENE AT LEAST ONE
C          HOUR AND RETURN TO C-130 STATION CLOSEST TO THE
C          CASE.  IF SO ARRANGE TO DIVERT THE AIRCRAFT
C          IF NOT LOOK FOR ANOTHER C-130 WITH MORE FLIGHT
C          TIME AVAILABLE ON SAME CASE
C
 5650 DIST=SQRT((FLOAT(NCASE(NG,3)-LATP)**2)+(FLOAT(NCASE
     1(NG,4)-LONP)**2))
      DISTR=FLOAT(NCASE(NG,11+NCASE(NG,6)))
      NTTT=((DIST+DISTR)/290.0)+0.5
      NAVTS=10-(NCTS-NPLANE(J,10))
      IF((NAVTS-NTTT).GE.1) GO TO 5690
 5660 CONTINUE
 5670 CONTINUE
C
C          UNABLE TO FIND A CASE OF THE RIGHT PRIORITY IN THE
C          SUBJECT AREA WITH MORE THAN ONE AIRCRAFT ASSIGNED
C          AND A C-130 WITH ENOUGH FLIGHT TIME TO DIVERT TO
C          OTHER CASE.  IF LOOKING AT PRIORITY ONE CASES TO
C          DIVERT FROM GO TO ANOTHER AREA TO SEE IF C-130S
C          ARE REQUIRED FOR POTENTIAL DIVERSION THERE -
C          OTHERWISE LOOK AT NEXT HIGHER PRIORITY CASES IN
C          SUBJECT AREA
C
 5675 IF(NTYD.EQ.1) GO TO 5680
      NTYD=NTYD-1
      GO TO 5560
C
C          UNABLE TO FIND DIVERTABLE C-130 FOR CASE IN SUB-
C          JECT AREA BEING EXAMINED.  IF LOOKING AT SOUTHERN
C          AREA, ALL AREAS HAVE BEEN COVERED SO RETURN -
C          OTHERWISE LOOK AT NEXT AREA SOUTH OF LAST AREA EX-
C          AMINED TO SEE IF REQUIREMENT EXISTS THERE TO DI-
C          VERT A C-130
C
 5680 IF(ND.EQ.3) GO TO 5700
      ND=ND+1
      IF(ND.EQ.2) GO TO 5530
      IF(ND.EQ.3) GO TO 5540
C
C          C-130 IS TO BE DIVERTED TO ANOTHER CASE SO
C          INITIALIZE CALLING PARAMETERS WITH C-130 TO BE DI-
C          VERTED, CASE IT IS TO BE DIVERTED TO AND CASE IT
C          IS TO BE DIVERTED FROM AND CALL SUBROUTINE FILL
C
 5690 NPANE=J
      NACE=NCASA(M,1)
      NCLOSE=I
      CALL FILL
C
C          ADJUST AREA AND TOTAL C-130 REQUIREMENT TALLIES.
C          IF NO MORE C-130S ARE REQUIRED THIS STEP, RETURN -
C          OTHERWISE DETERMINE WHETHER CURRENT AREA BEING
C          EXAMINED HAS MORE PRIORITY ONE CASES WITHOUT AN
C          AIRCRAFT, IF SO, ATTEMPT TO DIVERT FOR SUBJECT
C          CASES, IF NOT, GO TO NEXT AREA TO CHECK
C
      NUR(ND)=NUR(ND)-1
      NTUR=NTUR-1
      IF(NTUR.EQ.0) GO TO 5700
      IF(NUR(ND).GT.0) GO TO 5560
      IF(ND.EQ.3) GO TO 5700
      ND=ND+1
      IF(ND.EQ.2) GO TO 5530
      IF(ND.EQ.3) GO TO 5540
 5700 CONTINUE
      RETURN
      END
```

ABBREVIATED LISTING OF SIMULATION PROGRAM NOMENCLATURE

ALATN - MEAN DISTANCE NORTH OF MAINE OF HC-130 SAR CASES WHICH OCCUR NORTH OF MAINE

ALCN - MEAN DISTANCE FROM COAST OF HC-130 SAR CASES IN THE ATLANTIC

DIST - DISTANCE FROM HC-130 STATION OF DEPARTURE TO CASE

DISTG - DISTANCE HC-130 MUST TRAVEL IN TRANSFERRING FROM STATION IT IS AT TO THE STATION CLOSEST TO CASE

DISTR - DISTANCE FROM CASE TO NEAREST HC-130 STATION

JDEC - INDICATOR OF WHETHER CASES OR MISSIONS ARE TO BE EXAMINED IN SUBROUTINE ASSIGN AND ASSIGNMENT LEVEL TO BE ATTEMPTED
  -1 = CASE, 1 PLANE, NO OUT OF AREA PLANE
  0 = CASE, FILL
  1 = CASE, 1 PLANE
  2 = CASE, 50 PERCENT
  4 = MISSION, 1 PLANE
  5 = MISSION, FILL
  10 = MISSION, 1 PLANE, NO OUT OF AREA PLANE

JPRI - PRIORITY OF CASES OR MISSIONS TO BE EXAMINED IN SUBROUTINE ASSIGN

K - BASIC CONSTANT FOR RANDOM NUMBER GENERATORS

LAC (3) - DISTANCE IN NAUTICAL MILES ALONG SIMULATED ATLANTIC COAST LINE, FROM BASE LINE, OF HC-130 STATIONS
  1 = NORTHERN STATION
  2 = CENTRAL STATION
  3 = SOUTHERN STATION

LATC - LATITUDE OF PROSPECTIVE SUBSTITUTABLE CASE OR MISSION (NM)

LC - PROSPECTIVE SUBSTITUTABLE CASE COUNTER

LM - PROSPECTIVE SUBSTITUTABLE MISSION COUNTER

LONGC - LONGITUDE OF PROSPECTIVE SUBSTITUTABLE CASE OR MISSION (NM)

NACE - LOCATION OF CASE IN NCASE VECTOR ARRAY WHICH IS HAVING AN HC-130 ASSIGNED TO IT

NAREA - INDICATOR OF HC-130 STATION AREA OF CONCERN
  1 = NORTHERN AREA
  2 = CENTRAL AREA
  3 = SOUTHERN AREA

NCASA (10,3) - ACCOUNTING VECTOR ARRAY FOR CASES REQUIRING AN HC-130 DEPARTURE DURING CURRENT TIME STEP
  1 = CASE LOCATION IN NCASE ARRAY
  2 = PRIORITY
  3 = CLOSEST HC-130 STATION

NCASE (50,17) - ACCOUNTING VECTOR ARRAY FOR ACTIVE SAR CASES
  1 = PRIORITY - 1,2,3
  2 = CONTINUOUS CASE OR NOT
    1 - CONTINUOUS
    0 - NOT CONTINUOUS
  3 = DISTANCE OF CASE NORTH OF SIMULATED COAST BASE LINE (NM)
  4 = DISTANCE OF CASE EAST OR WEST OF SIMULATED ATLANTIC COAST LINE AND ITS PROJECTION
    EAST = +
    WEST = -
  5 = SUBSTITUTABLE CASE OR NOT
    1 - SUBSTITUTABLE
    0 - NOT SUBSTITUTABLE
  6 = CLOSEST HC-130 STATION
    1 - NORTHERN STATION
    2 - CENTRAL STATION
    3 - SOUTHERN STATION
  7 = # OF HC-130S REQUIRED
  8 = TOTAL FLIGHT HOURS REQUIRED ON-SCENE
  9 = TIME TO SEND NEXT HC-130
  10 = NOT USED - SET = 1
  11 = NUMBER OF AIRCRAFT ASSIGNED TO CASE
  12 = DISTANCE FROM NORTHERN HC-130 STATION
  13 = DISTANCE FROM CENTRAL HC-130 STATION
  14 = DISTANCE FROM SOUTHERN HC-130 STATION
  15 = TIME STEP THAT CASE CLOSES
  16 = CASE NUMBER
  17 = NUMBER OF HC-130S ON-SCENE

NCLCSE - LOCATION IN NCASE VECTOR ARRAY OF CASE FROM WHICH AN HC-130 IS BEING DIVERTED FOR ANOTHER CASE

NCSUB (5,3) - ACCOUNTING VECTOR ARRAY FOR PROSPECTIVE SUBSTITUTABLE CASES
  1 = CASE LOCATION IN NCASE ARRAY
  2 = PRIORITY
  3 = HC-130 STATION AREA CASE IS IN

NCTS - TIME STEP COUNTER

ND - AREA THAT IS BEING SCANNED FOR DIVERTING HC-130S FROM CASES TO PRIORITY ONE CASE WITHOUT AN AIRCRAFT

NDAYTI - DAY/HOUR COUNTER

NDOWTI - TALLY VECTOR FOR HC-130 DOWN TIME DUE TO MAINTENANCE DISCREPANCIES

NG - INDICATOR OF LOCATION IN NCASE VECTOR ARRAY OF CASE THAT HC-130 IS TO BE DIVERTED TO

NHACT (20,6) - HELICOPTER ACTIVITY ACCOUNTING VECTOR ARRAY
  1 = TYPE HELICOPTER
    3 - HH-3F
    5 - HH-52A
  2 = STATION HELICOPTER IS FROM - BY NUMBER IN STATION ARRAY
  3 = TIME HELICOPTER IS TO RETURN
  4 = NUMBER OF CASE HELICOPTER IS ON
  5 = NUMBER OF MISSION HELICOPTER IS ON
  6 = TIME DEPART SCENE OR MISSION

NISSN - MISSION LOCATION WITHIN NMISSN VECTOR ARRAY TO WHICH AN HC-130 IS BEING ASSIGNED

NMFLST - TALLY VECTOR FOR MISSION FLIGHT HOURS NOT FLOWN

NMISA - SAME AS NCASA ONLY FOR MISSIONS

(20,3)

NMISSN (100,16) - ACCOUNTING VECTOR ARRAY FOR ACTIVE NON-SAR MISSIONS
- 1 = PRIORITY - 1,2,3
- 2 = NUMBER OF TIME STEPS WHICH MISSION CAN BE HELD BEYOND SCHEDULED DEPARTURE TIME WITHOUT BEING CANCELLED
- 3 = DISTANCE OF MISSION PICK UP POINT NORTH OF SIMULATED COAST BASE LINE (NM)
- 4 = DISTANCE OF MISSION PICK UP POINT EAST OR WEST OF SIMULATED ATLANTIC COAST LINE AND ITS PROJECTION
  - EAST = +
  - WEST = -
- 5 = SUBSTITUTABLE MISSION OR NOT
  - 1 - SUBSTITUTABLE
  - 0 - NOT SUBSTITUTABLE
- 6 = NEAREST HC-130 STATION
- 7 = # OF HC-130S REQUIRED
- 8 = TOTAL MISSION FLIGHT HOURS
- 9 = TIME STEP HC-130 IS TO DEPART
- 10 = TIME STEP MISSION SCHEDULED TO CLOSE
- 11 = NUMBER OF AIRCRAFT ASSIGNED
- 12 = DISTANCE FROM NORTHERN HC-130 STATION
- 13 = DISTANCE FROM CENTRAL HC-130 STATION
- 14 = DISTANCE FROM SOUTHERN HC-130 STATION
- 15 = # OF TIME STEPS MISSION UNDERWAY (OPERATING HOURS)
- 16 = MISSION NUMBER

NMSUB (5,3) - SAME AS NCSUB ONLY FOR PROSPECTIVE SUBSTITUTABLE MISSIONS

NNSCTD - NUMBER OF NON-SAR MISSIONS TO BE INITIATED DURING TIME STEP

NODSC - TALLY VECTOR FOR NON-PEAK RATE DAY SAR CASES

NPANE - PLANE LOCATION IN NPLANE VECTOR ARRAY OF HC-130 BEING ASSIGNED TO A PARTICULAR CASE OR MISSION

NPIS - TOTAL NUMBER OF HC-130S ALLOCATED TO STATIONS

NPLANE (15,16) - ACCOUNTING VECTOR ARRAY FOR HC-130 AIRCRAFT
- 1 = HC-130 STATION ASSIGNED TO
  - 1 - NORTHERN STATION
  - 2 - CENTRAL STATION
  - 3 - SOUTHERN STATION
- 2 = STATUS
  - 0 - READY TO FLY
  - 1 - ENROUTE AFTER FLIGHT ABORT
  - 2 - DOWN FOR MAINTENANCE
  - 3 - DOWN IF CALLED (START UP DOWN)
  - 4 - ON MISSION
  - 5 - ENROUTE TO SAR CASE SCENE
  - 6 - ON-SCENE
  - 7 - ENROUTE FROM SAR CASE SCENE
  - 8 - ENROUTE FROM ONE STATION TO ANOTHER
  - 9 - GROUNDED DUE TO WEATHER
- 3 = NUMBER OF TIME STEPS AIRCRAFT IS DOWN
- 4 = TIME OF NEXT STATUS CHANGE
- 5 = NOT USED
- 6 = NUMBER OF CASE AIRCRAFT IS ON
- 7 = NUMBER OF MISSION AIRCRAFT IS ON
- 8 = HC-130 STATION AIRCRAFT IS TO RETURN TO
- 9 = HC-130 STATION AIRCRAFT IS AT
- 10 = TIME AIRCRAFT DEPARTED
- 11 - 16 = NOT USED

NPRT (3) - NUMBER OF AIRCRAFT REQUIRED IN HC-130 AREA DURING PARTICULAR TIME STEP
1 = NORTHERN AREA
2 = CENTRAL AREA
3 = SOUTHERN AREA

NRNSC - TALLY VECTOR FOR REGULAR NON-SAR MISSIONS

NRNSCT - TIME STEP OF NEXT REGULAR NON-SAR MISSION TAKE OFF TIME WITH A NEW MISSION TO BE STARTED

NRONA (3) - TALLY VECTOR FOR RONS AT THE THREE AIR STATION LOCATIONS

NRONF (3) - TALLY VECTOR FOR RONS AWAY FROM THE THREE AIR STATION LOCATIONS

NRTN - CALLING PARAMETER FOR SUBROUTINE FILL TO INDICATE AIRCRAFT IS TO BE RETURNED TO ITS HOME AIR STATION

NSCA - SEE LISTING OF REQUIRED INPUTS, CARD 18

NSCT - TIME STEP OF NEXT SAR CASE CALL

NSCTD - NUMBER OF SAR CASE CALLS RECEIVED DURING TIME STEP

NSHLST - TALLY VECTOR FOR SAR ON-SCENE HOURS NOT FLOWN

NSNA - SEE LISTING OF REQUIRED INPUTS, CARD 18

NSPL - TALLY VECTOR FOR SPECIAL NON-SAR MISSIONS

NSPNST - TIME OF SPECIAL, NON-SAR MISSION CALL

NSSA - SEE LISTING OF REQUIRED INPUTS, CARD 18

NSSMSC - TALLY VECTOR FOR PEAK RATE DAY SAR CASES

NSTA (25,12) - HELICOPTER STATION VECTOR ARRAY. SEE LISTING OF REQUIRED INPUTS, CARD 19

NTOS - NUMBER OF TIME STEPS HELICOPTER HAS AVAILABLE ON-SCENE

NTPA - TOTAL NUMBER OF HC-130S AVAILABLE DURING A SPECIFIC TIME STEP

NTPR - TOTAL NUMBER OF AIRCRAFT REQUIRED DURING A SPECIFIC TIME STEP

NTPAN - INDICATOR OF WHETHER HC-130 IS BEING TRANSFERRED TO NEAREST STATION FOR CASE OR NOT
1 = BEING TRANSFERRED
0 = NOT BEING TRANSFERRED

NTTG - FLIGHT HOURS FROM ONE STATION TO THE OTHER CORRECTED FOR NON-DIRECT PATH

NTTR - TOTAL FLIGHT HOURS REQUIRED IF HC-130 IS TO GO DIRECTLY TO SCENE AND RETURN TO STATION CLOSEST TO CASE

NTUR - TALLY OF TOTAL NUMBER OF HC-130S REQUIRED BY CASES OR MISSIONS OF THE SPECIFIED PRIORITY TO BE BROUGHT UP TO SPECIFIED ASSIGNMENT LEVEL IN SUBROUTINE ASSIGN

NTYPE - PRIORITY OF CASES BEING EXAMINED FOR POSSIBLE REMOVAL OF HC-130 TO DIVERT TO ANOTHER CASE

NTYSUB - INDICATOR OF WHETHER SUBSTITUTION IS BEING ATTEMPTED FOR A CASE OR A MISSION
  1 = CASE
  2 = MISSION

NUMFHR - TALLY VECTOR FOR MISSION FLIGHT HOURS REQUESTED

NUR (3) - AREA TALLY VECTOR OF NUMBER OF HC-130S REQUIRED BY CASES OR MISSIONS OF THE SPECIFIED PRIORITY TO BE BROUGHT UP TO SPECIFIED ASSIGNMENT LEVEL IN SUBROUTINE ASSIGN

NUSFHR - TALLY VECTOR FOR SAR ON-SCENE HOURS REQUESTED

PCSGU - CONDITIONAL PROBABILITY THAT GIVEN A SAR CASE IS IN THE SEVENTH OR EIGHTH COAST GUARD DISTRICT IT IS IN THE GULF OF MEXICO OR THE SOUTHERN ATLANTIC AREA

PSC - SEE LISTING OF REQUIRED INPUTS, CARD 5

PSSC - SEE LISTING OF REQUIRED INPUTS, CARD 13

TCP (3) - SAR CASE PRIORITY CUMMULATIVE DISTRIBUTION FUNCTION CUTOFFS

TMONTH (12,14) - MONTHLY VARIABLE PARAMETERS; SEE LISTING OF REQUIRED INPUTS, CARDS X+1 TO (END-(NRUNS-1))

TTS - TIME STEPS REQUIRED FOR HELICOPTER TO GET TO SAR CASE SCENE

Z - BASIC CONSTANT FOR RANDOM NUMBER GENERATORS

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This study examines alternative locations for the eight HC-130, long-range, fixed-wing aircraft available in the U. S. Coast Guard Atlantic Area during the FY 75 - FY 84 period. The objective was to achieve the maximum effectiveness possible at a reasonable cost. A computer simulation of HC-130 air operations in the region of interest was developed to produce relevant cost and operational effectiveness measurements. The

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study indicates that of the three potential sites considered--Coast Guard Air Station Cape Cod, Massachusetts, Coast Guard Air Station Elizabeth City, North Carolina, and the St. Petersburg-Clearwater International Airport, Florida--assignment of three HC-130s at CGAS Elizabeth City and five at St. Petersburg-Clearwater is optimal.

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